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Zool. Fauna

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

VOLUME II.

(*DECADES XI. TO XX.*)

BY

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PREFACE.

This eleventh Decade gives illustrations in the first plate, No. 101, of the only Victorian specimen known of the great Luth, or Leathery Turtle, the largest of the living Chelonians, and certainly identical with the Old World and American examples.

The second plate, 102, gives the first recognisable figure of one of the most extraordinary of Australian Lizards, the Rugged Stump-tail, or Shingle-back, Lizard; the short head-like tail, and very large, thick, rugged scales of which suggest two of the popular names given to it.

The next plate, 103, shows one of what I venture to call our "Worm-Snakes," the *Typhlops nigrescens*, which burrows in the light soils of the warm northern part of the colony, and is often found in ants' nests.

The fourth plate, 104, is of great interest, not only as giving the first accurate figure of the most famous of all Sharks, the Basking Shark, the largest of all known fishes (upwards of thirty feet long), but as representing the only recorded occurrence of the species south of the Equator. The food has now for the first time been identified with certainty as a very minute Pteropodous

Mollusc *Cuvieria minor* (McCoy), less than the twelfth of an inch in length; reminding one of the similarly minute food of many Whales.

The next four plates continue the illustrations of Victorian Polyzoa, the descriptions and type specimens of which have been given by Mr. MacGillivray for this work and the National Museum.

Plate 109 illustrates the largest species of the group of Insects popularly called Grasshoppers, and often confounded with Locusts. In this I observed for the first time the probable position of the organ of hearing in Insects, in a similar position to that of Macrourous Crustacea. This species is a close representative of the Great Green Grasshopper of Europe, and has not been figured before.

The last plate, 110, gives detailed illustrations of our common Yellow-winged Locust as a type of the great group of Locusts, often confounded with Grasshoppers, but the characteristic structural differences of these two groups are shown in contrast by the figures on this and the preceding plate.

The succeeding Decades will illustrate as many different genera as possible, and will deal first usually with species of some special interest, and of which good figures do not exist or are not easily accessible.

FREDERICK McCOY.

30th July, 1885.

ZOOLOGY OF VICTORIA

(Reptiles)

A. Bartholomew del et lith. | Prof. M^c Coy direx^t | Steam Litho Govt. Printing Office

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,, *Lepralia*, I., 36; *vide* Chorizopora.
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,, var. diadema, Microporella, I., 37; II., 175; *vide Lepralia canaliculata.*
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,, serratus, I., 15; *vide* Astacopsis.
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,, *concinna*, I., 89; *vide* C. pulchella.
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cati[illegible], *Lepralia*, I., 35; *vide* Schizoporella.
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,, costazei, var., II., 148; *vide* Schismopora.
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,, platalea, II., 148, 168; *vide* Schismopora.
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,, *Dictyopora*, I., 47; *vide* Adeona.
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,, truttaceus, I., 16, 17; *vide* Arripis.
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cervicornis, Amphiblestrum, *vide Membranipora* I., 25.
,, *Emma*, I., 58; *vide* Menipea.
,, *Membranipora*, I., 25; *vide* Amphiblestrum.
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,, *Australis*, II., 112; *vide* Callorhynchus Antarcticus.
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,, *dædala*, II., 108; *vide* C. Cordieri.
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,, vittata, I., 36; *vide Lepralia*.
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,, Great Green, I., 50.
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,, *olivacea*, I., 50; *vide* Cyclochila Australasiæ.
cidaris, Cellepora, II., 165.
Cidarites tubaria, I., 100; *vide* Goniocidaris.
ciliata, Bicellaria, I., 59.
,, *Lepralia*, I., 37; II., 175; *vide* Microporella.
ciliata, *Membranipora*, I., 25; II., 127; *vide* Amphiblestrum ciliatum.
ciliata, Microporella, I., 37; II., 175; *vide Lepralia*.
,, var. personata, Microporella, I., 37; II., 175; *vide Lepralia*.
,, var. spicata, Microporella, I., 37; II., 175; *vide Lepralia*.
,, Sillago, II., 182.
ciliatum, Amphiblestrum, I., 25; II., 127; *vide Membranipora ciliata*.
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,, *Otaria*, I., 31, 71; *vide* Euotaria.
cinnamonicus, Tropinotus, II., 140; *vide* T. Australis.
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,, Schizoporella, I., 35; *vide Lepralia*.
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,, geminata, I., 24; *vide Catenicella*.
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concinna Catenicella, I., 89; *vide* C. pulchella.
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connexa, Amathia, II., 185; *vide* A. tortuosa.
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,, *Eucratea*, II., 108; *vide* Chlidonia Cordieri.
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,, Micropora, II., 196.
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,, *Testudo*, II., 101; *vide* Sphargis.
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,, var. Schizoporella, II., 186; *vide* S. hyalina.
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,, *Diachoris*, II., 117; *vide* Beania.
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,, monoceros, I., 38; II., 187; *vide Lepralia*.
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,, *Diachoris*, II., 117; *vide* Beania.
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,, *Macquariensis*, I., 84; *vide* C. ambiguus.

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curtus, Hoplocephalus, I., 3.
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,, *prælonga*, II., 116; *vide* C. longipora.
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,, *olivacea*, I., 50; *vide* C. Australasiæ.
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,, *fasciatus*, II., 171; *vide* C. occipitalis.
,, *flavigularis*, I., 72; *vide* C. gigas.
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dædala, Chlidonia, II., 108; *vide* C. Cordieri.
,, *Cothurnicella*, II., 108; *vide* C. Cordieri.
dædala, Schizoporella, II., 138.
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Datnia (?) ambigua, I., 84; *vide* Ctenolates ambiguus.
Dawsoni, Catenicella, I., 24; *vide* C. elegans.
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,, Loranthus, I., 8.
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,, *Catenicellopsis*, II., 107; *vide* Catenicella.
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,, Urceolipora, II., 105.
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,, *Eschara*, I., 48; *vide* Caleschara.
,, Flustra, I., 45.
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Dermochelys Atlantica, II., 101; *vide* Sphargis coriacea.
despecta, Entometa, I., 40; *vide* E. ignobilis.
Diachoris costata, II., 117; *vide* Beania.
,, Crotali, II., 117; *vide* Beania.
,, intermedia, II., 195; *vide* Beania.
Diachoris Magellanica, I., 46; *vide* Beania.
,, *patellaria*, II., 117; *vide* Amphiblestrum patellarium.
,, spinigera, I., 46; *vide* Beania.
diadema, Cellepora, II., 165.
,, *Lepralia*, I., 37; II., 175; *vide* Microporella canaliculata.
,, Microporella, I., 37; II., 175; *vide Lepralia*.
,, (var. canaliculata), Microporella, I., 37; II., 175; *vide Lepralia canaliculata*.
,, (var. lata), Microporella, I., 37; II., 175; *vide Lepralia*.
,, (var. longispina), Microporella, I., 37; II., 175; *vide Lepralia*.
,, (var. lunipuncta), Microporella, I., 37; II., 175; *vide Lepralia*.
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,, Mucronella, I.,35; *vide Lepralia*.
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,, *Flustrella*, II., 195; *vide* Verrucularia.
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,, cellulosa, I., 47; *vide* Adeona.
,, grisea, I., 66; *vide* Adeona.
,, Wilsoni, I., 67; *vide* Adeona.
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Diemenia aspidorhyncha, I., 23.
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,, superciliosa, I., 23.
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Dimetopia cornuta, I., 46.
,, hirta, II., 178.
,, spicata, I., 46.
Dinolestes Mülleri, II., 115; *vide* Lanioperca mordax.
Diplodactylus marmoratus, II., 132.
Discopora albirostris, II., 167; *vide* Cellepora.
dispar, Adeonella, I., 48; *vide Eschara*.
,, *Eschara*, I., 48; *vide* Adeonella.
,, *Membranipora*, I., 26; *vide* Thairopora.
,, Thairopora, I., 26; *vide Membranipora*.
dissimilis, Carbasea, I., 45.
distans, Hippothoa, II., 187.
,, Membraniporella, II., 187.
Diura rosaipennis, I., 79; *vide* Acrophylla violascens.
divaricata, Hippothoa, II., 187.
Dog-Fish, Picked, I., 75.
Dolphin, Yellow-sided, I., 22.
dorsalis, *Cystignathus*, I., 42; *vide* Limnodynastes.
,, Limnodynastes, I., 42.
Dragon, Leafy Sea-, I., 65.
Dragonet, Crook-spined, II., 192.
Dules auratus, I., 84; *vide* Ctenolates ambiguus.
d'Urvillei,? Eudoxyla, I., 30; *vide* Zeuzera (Eudoxyla) Eucalypti.
Dusky Flat-horned Locust, II., 139.

E.

Earless Lizard, White-streaked, II., 181.
Eagle-Ray, Blue-spotted, I., 63.
Earth-Worm, Australian Giant, I., 7.
Echinorhinus *obesus*, II., 144; *vide* E. spinosus.
,, spinosus, II., 144.
Edwardsiana, Crisia, I., 39.
,, *Crisidia*, I., 39; *vide* Crisia.
Edwardsi, Palinurus, II., 149, 150; *vide* P. Lalandi.
Egernia Cunninghami, II., 141.
Eight-rayed Cushion Star-fish, II., 200.
Electra amplectens, II., 187.
,, flagellum, II., 106.
,, pilosa, I., 25; *vide Membranipora.*
elegans, Carbasea, I., 45.
,, Catenicella, I., 24.
elegans, Eschara, I., 48; *vide* Lepralia quadrata.
elegans, Lepralia, I., 36.
elegans, Steganoporella, I., 60; *vide* S. magnilabris.
Elephant Fish, II., 112.
Ellerii *Lepralia*, I., 37; *vide* Mucronella.
,, Mucronella, I., 37; *vide Lepralia.*
elongata, Metura, I., 40.
elongatus, Oiketicus, I., 40; *vide* Metura elongata.
Emma cervicornis, I., 58; *vide* Menipea id.
Emys Macquaria, I., 82, 83; *vide* Chelymys.
Entometa *despecta*, I., 40; *vide* E. ignobilis.
,, ignobilis, I., 40.
Ephippitytha *maculata*, II., 120; *vide* Phaneroptera (Ephippitytha) trigintiduoguttata.
(Ephippitytha) trigintiduoguttata, Phaneroptera, II., 120.
episcopalis, *Carbasea*, I., 45; *vide* Euthyris.
,, Euthyris, I., 45; *vide Carbasea.*
Eschara denticulata, I., 48; *vide* Caleschara.
,, dispar, I., 48; *vide* Adeonella.
,, *elegans*, I., 48; *vide* Lepralia quadrata.
,, gracilis, I., 48; *vide* Porina.
,, mucronata, I., 48; *vide* Adeonellopsis.
,, obliqua, I., 48; *vide* Parmularia.
,, platalea, I., 48; *vide* Adeonella.
,, quadrata, I., 48; *vide* Lepralia.
Escharipora stellata, II., 175.
Esox saurus, II., 135; *vide* Scomberesox saurus, var. Forsteri.
eucalypti, Zeuzera (Eudoxyla), I., 30.
Eucratea chelata, II., 178; *vide* Scruparia.
,, Cordieri, II., 108; *vide* Chlidonia.
Eudoxyla, *d'Urvillei,?* I., 30; *vide* Zeuzera (Eudoxyla) Eucalypti.
(Eudoxyla) Zeuzera Eucalypti, I., 30.
Euotaria cinerea, I., 31, 71.
Euthyris episcopalis, I., 45; *vide Carbasea.*
excavata, *Lepralia*, I., 38; *vide* Mucronella.
,, Mucronella, I., 38; *vide Lepralia.*

F.

False Delma Lizard, Fischer's, II., 162.
falx, Trachypterus, II., 122; *vide* T. tænia.
Farcimia appendiculata, II., 178.
Farciminaria aculeata, II., 158.
Farciminaria dichotoma, II., 195; *vide* Verrucularia.
Farciminaria simplex, II., 158.
,, uncinata, II., 158.
farciminoides, Salicornaria, I., 49; *vide* Cellaria (*fistulosa*) Australis.
fasciatus, Cyclodus, II., 171; *vide* C. occipitalis.
Fasciculipora bellis, II., 157.
,, fruticosa, II., 157.
,, gracilis, II., 157.
,, ramosa, II., 157.
ferox, Hiantopora, I., 38; *vide Lepralia.*
,, *Lepralia*, I., 38; *vide* Hiantopora.
Festra affabricata, II., 197; *vide* Chelepteryx Collesi.
Fischer's False Delma Lizard, II., 162.
Fish, Angel, I., 34.
,, Australian Rough, II., 114.
,, Banks' Oar-, II., 145.
,, Bleeker's Parrot-, II., 134.
,, Craw-, Sydney, II., 159.
,, Craw-, Melbourne, II., 149, 150.
,, Cray-, Yabber or Yabbie, I., 29.
,, ,, Yarra Spiny, II., 160.
,, Cuttle-, Australian Tooth-cupped, I., 76, 77.
,, ,, Gould's Squid, II., 169, 170.
,, ,, Large Melbourne Sepia, or, II., 188, 189, 190.
,, Dog-, Picked, I., 75.
,, Elephant, II., 112.
,, Gar-, Black-finned Half-beak, or Sea, II., 135.
,, Oar-, Banks', II., 145.
,, Parrot-, Bleeker's, II., 134.
,, ,, Broad-striped, or Senator, II., 163.
,, Ribbon-, Southern Silver, II., 122.
,, Rough-, Australian, II., 114.
,, Saw-, Common Australian, I., 56.
,, Star-, Eight-rayed Cushion, II., 200.
,, ,, Gunn's Cushion, II., 200.
,, ,, Twelve-plated Shield, II., 200.
,, Toad-, Two-pronged, II., 123.
,, Yarra Spiny Cray-, II., 160.
fissa, Retepora, I., 94, 95.
fistulosa, var. Australis, Cellaria, I., 49; *vide* C. Australis.
flagellum, Electra, II., 106.
flagellum, Hippothoa, II., 187; *vide* H. distans.
flagellum, Hoplocephalus, I., 11.
,, *Membranipora*, II., 106; *vide* Electra.
Flat-horned Locust, Dusky, II., 139.
flavigularis, Cyclodus, I., 72; *vide* C. gigas.
Flemingii, Amphiblestrum, II., 106.
florea, Spiralaria, I., 46.
Flosculipora pygmæa, II., 176.
Flustra denticulata, I., 45.
Flustra Lacroixii, I., 26; *vide* Membranipora.
,, *lineata*, I., 26; II., 127; *vide* Membranipora pyrula.
,, membranacea, I., 25; *vide* Membranipora.
,, *membraniporides*, II., 177; *vide* Craspedozoum roboratum.
,, pilosa, I., 25; *vide* Electra.
Flustrella dichotoma, II., 195; *vide* Verrucularia.
foliacea, Hornera, II., 118.
,, *Retihornera*, II., 118; *vide* Hornera.
foliata, Cellepora, II., 166, 168.
foliatus, Phyllopteryx, I., 65.

foliatus, *Syngnathus*, I., 65; *vide* Phyllopteryx.
formosa, Catenicella, I., 24.
,, Retepora, I., 94,97.
Forsteri, Scomberesox saurus, var., II., 135.
fragilis, Biflustra, I., 57; *vide* B. perfragilis.
Frazeri, Delma, II., 153.
Frazer's Delma, II., 153.
Frog, Common Sand-, I., 42.
,, Green and Golden Bell-, I., 53.
,, Spotted Marsh-, I., 42.
fruticosa, Fasciculipora, II., 157.
funiculata, Menipea, II., 177.
Furina bicucullata, I., 32.
Furina-Snake, Two-hooded, I., 32.
Fur-Seal or Sea-Bear, I., 31, 71.
fusca, Catenicella, I., 90.
,, Cellepora, II., 167, 168.

G.

Gadopsis gibbosus, I., 27.
,, gracilis, I., 27.
Galeus Australis, I., 64.
Gar-Fish, Black-finned Half-beak, or Sea, II., 135
Gasterosteus saltatrix, II., 183; *vide* Temnodon saltator.
gastrosticta, Hinulia, II., 191; *vide* H. Quoyi.
Gecko, Marbled, II., 132.
,, Thick-tailed, II., 132.
gemella, Catenicella, II., 146.
Gemellipora striatula, II., 138.
geminata, *Catenicella*, I., 24; *vide* Claviporella.
,, Claviporella, I., 24; *vide Catenicella*.
,, Stomatopora, II., 176.
Genypterus Australis, I., 27.
,, *blacodes* (?), I., 27; *vide* G. Australis.
,, *tigerinus*, I., 27; *vide* G. Australis.
Georgianus, Arripis, II., 184.
,, *Centropristes*, II., 184; *vide* Arripis.
Giant Earth-Worm, Australian, I., 7.
Gibbose Blackfish, I., 27.
gibbosus, Gadopsis, I., 27.
gigas, *Cancer*, II., 179, 180; *vide* Pseudocarcinus.
,, Cyclodus, I., 72.
,, Pseudocarcinus, II., 179, 180.
,, *Scincus*, I., 72; *vide* Cyclodus.
Gippslandica, Perichæta, I., 7.
Gippsland Perch, I., 14.
,, Water-Lizard, I., 81.
Girella simplex, I., 73.
glabra, *Bicellaria*, II., 195; *vide* Stirparia.
,, Caberea, II., 137.
,, Stirparia, II., 195.
Glesne, Regalecus, II., 145; *vide* R. Banksi.
glomerata, *Cellepora*, II., 148, 168; *vide* Schismopora.
,, Schismopora, II., 148, 168; *vide Cellepora*.
glycine, Agarista, I., 8.
,, *Phalænoides*, I., 8; *vide* Agarista.
Goat Moth, Large Wattle, I., 30.
Golden Bell-Frog, Green and, I., 53.
,, Perch, Murray, I., 84.
Goniocidaris tubaria, I., 100.
Gouldi, *Hydrosaurus*, II., 151; *vide* Monitor.
,, Monitor, II., 151.
Gouldi, Ommastrephes, II., 169, 170.
Gould's Monitor Lizard, II., 151.
,, Squid, II., 169, 170.
gracilenta, Catenicella, II., 146.
gracilis, Cellaria, I., 49.
,, *Eschara*, I., 48; *vide* Porina.
,, Fasciculipora, II., 157.
,, Gadopsis, I., 27.
,, Porina, I., 48; *vide Eschara*.
,, *Salicornaria*, I., 49; *vide* Cellaria.
Grammatophora barbata, II., 121.
,, muricata, II., 111.
,, *vide Amphibolurus*.
grandis, Bicellaria, I., 59.
,, Caberea, II., 136.
grandis, Seriola, II., 172; *vide* S. Lalandi.
granulata, Retepora, I., 94, 99.
Grasshopper, Great Green Gum-tree, II., 109.
,, Smaller Green Gum-tree, II., 119.
,, Thirty-two Spotted, II., 120.
Grayi, Delma, II., 153; *vide* D. Frazeri.
Great Black, or Manna Cicada, I., 50.
,, Green Cicada, I., 50.
,, Green Gum-tree Grasshopper, II., 109.
,, Red King-Crab, II., 179, 180.
Green and Golden Bell-Frog, I., 53.
,, Cicada, Great, I. 50.
,, Cicada, Great Black or Manna, I., 50.
,, Gum-tree Grasshopper, Great, II., 109.
,, Gum-tree Grasshopper, Smaller, II., 119.
Grilli, *Gymnetrus*, II., 145; *vide* Regalecus Banksi.
grisea, Adeona, I., 66; *vide Dictyopora*.
,, *Dictyopora*, I., 66; *vide* Adeona.
Gryllus Australis, II., 140; *vide* Tropinotus.
,, *musicus*, II., 110; *vide* Œdipoda musica.
,, *pictus*, II., 110; *vide* Œdipoda musica.
Grystes Macquariensis, I., 85, 86; *vide* Oligorus.
,, *Peeli*, I., 85, 86; *vide* Oligorus Macquariensis.
Gum-tree Grasshopper, Great Green, II., 109.
,, ,, Smaller Green, II., 119.
Gunneri, Cetorhinus, II., 104; *vide* C. maximus.
Gunni, Asterina, II., 200.
Gunn's Cushion Star-fish, II., 200.
Gurnard, Spiny-sided Butterfly, I., 5.
,, Kumu, I., 6.
Gurnet-Perch, Banded Red, I., 33.
,, Spotted Red, II., 193.
Gymnetrus Banksi, II., 145; *vide* Regalecus.
,, *Grilli*, II., 145; *vide* Regalecus Banksi.
,, *Hawkinsi*, II., 145; *vide* Regalecus Banksi.
Gymnobelideus Leadbeateri, I., 91.

H.

Half-beak or Sea Garfish, Black-finned, II., 135.
Hammer-headed Shark, I., 56.
Hannafordi, Catenicella, I., 24.
Harpalyce, *Papilio*, I., 9; *vide* Pieris (Thyca)
,, Pieris (Thyca), I., 9.
Hassallii, *Cellepora*, II., 148; *vide* Schismopora Costazei.
hastata, Catenicella, I., 24.
Hawkinsi, *Gymnetrus*, II., 145; *vide* Regalecus Banksi.

Hemiramphus intermedius, II., 135.
,, *melanochir*, II., 135; *vide* H. intermedius.
heptacanthus, *Chilodipterus*, II., 183; *vide* Temnodon saltator.
,, Temnodon, II., 183; *vide* T. saltator.
(Heptanchus) Notidanus Indicus, I., 43.
Heterodontus Phillipi, II., 113.
Heteroscarus Macleayi, II., 164.
heterurus, *Amphibolurus*, I., 81; *vide* Physignathus Lesueri, var. Howitti.
Hiantopora ferox, I., 38; *vide Lepralia.*
Hinulia *gastrosticta*, II., 191; *vide* H. Quoyi.
,, Lizard, Quoy's, II., 191.
,, ,, White's, II., 191.
,, Quoyi, II., 191.
,, Whitei, II., 191.
Hippocampus breviceps, I., 65.
hippocrepis, *Balistes*, II., 125; *vide* Monacanthus.
,, Monacanthus, II., 125.
Hippothoa catenularia, II., 106; *vide* Pyripora.
,, *crassa*, II., 106; *vide* Pyripora.
Hippothoa distans, II., 187.
,, divaricata, II., 187.
,, *flagellum*, II., 187; *vide* H. distans.
,, *Patagonica*, II., 187; *vide* H. divaricata.
hirsuta, Cellaria, I., 49.
,, *Onchopora*, I., 49; *vide* Tubucellaria.
,, *Salicornaria*, I., 49; *vide* Cellaria.
,, Tubucellaria, I., 49.
hirta, Dimetopia, II., 178.
Homianus, Cetorhinus, II., 104; *vide* C. maximus.
Hooded Furina-Snake, Two-, I., 32.
Hoplocephalus coronoides, I., 11.
,, curtus, I., 3.
,, flagellum, I., 11.
,, superbus, I., 2.
Hornera foliacea, II., 118.
,, robusta, II., 118.
Horse Mackerel, I., 18.
Horse-shoe-marked Leather-Jacket, II., 125.
Horse, Sea-, Short-headed I., 65.
Hound, Australian Smooth-, I., 87.
Howitti, Physignathus Lesueri, var., I., 81.
Hügeli, Palinurus, II., 159.
hyalina, *Lepralia*, I., 38; II., 186; *vide* Schizoporella hyalina, var. pellucida.
,, var. pellucida, Schizoporella, I., 38; II., 186; *vide Lepralia* hyalina.
Hydraspis Australis, I., 82, 83; *vide* Chelymys Macquaria.
Hydrosaurus Gouldi, II., 151; *vide* Monitor.
Hydrosaurus varius, I., 41.
Hyla Jacksoniensis, I., 53; *vide* Ranoidea aurea.
Hysteropus Novæ Hollandiæ, II., 152, 153; *vide* Pygopus lepidopus.
hystrix, Lekythopora, II., 156.

I.

Ibacus Crab, Péron's, II., 199.
,, *incisus*, II., 199; *vide* I. Peronii.
,, Peronii, II., 199.
Idmonea Australis, I., 68.
Idmonea Milneana, I., 68.
,, radians, I., 68.
ignobilis, Entometa, I., 40.
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impar, Pseudodelma, II., 162.
imperforata, Claviporella, II., 146.
inarmata, Amathia, II., 185.
,, Membranipora, II., 127.
incisus, Ibacus, II., 199; *vide* I. Peronii.
incrassata, var., Schizoporella, II., 186; *vide* S. hyalina.
Indicus, Notidanus (Heptanchus), I., 43.
indivisa, Carbasea, I., 45.
innominata, Cribrilina, II., 187; *vide* C. radiata.
intermedia, Beania, II., 195.
,, Catenicella, I., 24, 89.
,, Cellepora, II., 166.
,, *Diachoris*, II., 195; *vide* Beania.
intermedius, Hemiramphus, II., 135.
iodomus, Tropidoderus, I., 69, 70.
iris (*?*), Trachypterus, II., 122; *vide* T. tænia.
Istiurus Lesueri, I., 81; *vide* Physignathus.
Itea, Pyrameis, II., 198.

J.

Jacksoniensis, *Agama*, II., 111; *vide* Grammatophora muricata.
,, *Hyla*, I., 53; *vide* Ranoidea aurea.
,, Ranoidea, I., 53; *vide* R. aurea.
Jervoisii, *Steganoporella*, II., 196; *vide* Thairopora.
,, Thairopora, II., 196.
Jew Lizard, II., 121.

K.

Keel-backed Locust, Cinnamon, II., 140.
Kershawi, *Cynthia*, II., 198; *vide* Pyrameis.
,, Pyrameis, II., 198.
King-Crab, Great Red, II., 179, 180.
Kumu Gurnard, I., 6.
,, Trigla, I., 6.

L.

Labrichthys Bleekeri, II., 134.
,, laticlavius, II., 163.
Lace Lizard, I., 41.
Lacerta muricata, II., 111; *vide* Grammatophora.
,, *sincoides*, I., 72; *vide* Cyclodus gigas.
,, *varia*, I., 41; *vide* Hydrosaurus varius.
Lacroixii (?), *Flustra*, I., 26; *vide* Membranipora id.
,, Membranipora, I., 26.
lævis, Catenicella, var., I., 24; *vide* C. plagiostoma.
,, Mucronella, II., 116.
Lagenipora nitens, II., 156.
,, tuberculata, II., 156.
Lalandi, Palinurus, II., 149, 150.
,, Seriola, II., 172.
lamia, Carcharodon, I., 74; *vide* C. Rondeletii.
Lanioperca mordax, II., 115.
Laplacei, *Saturnia*, II., 197; *vide* Chelepteryx Collesi.

Large Melbourne Sepia, or Cuttle-Fish, II., 188, 189, 190.
,, Pink-winged Phasma, I., 80.
,, Wattle Goat-Moth, I., 39.
larvalis, *Lepralia*, I., 37; *vide* Porina.
,, Porina, I., 37; *vide Lepralia.*
lata, var. diadema, Microporella, II., 175.
,, Schizoporella, II., 138.
Lates colonorum, I., 14.
,, antarcticus, I., 14.
laticlavius, Labrichthys, II., 163.
latisinuata, Schizoporella, II., 186.
latistylus, Mantis, II., 130.
(laxa, var.) Retepora porcellana, I., 94, 95.
Leadbeateri, Gymnobelideus, I., 91.
Leafy Sea-Dragon, I., 65.
Leather-Jacket, Brown's Tooth-brush, II., 124.
,, Horse-shoe-marked, II., 125.
,, Péron's, II., 143.
Leathery Turtle, or Luth, II., 101.
Lekythopora hystrix, II., 156.
Leopard Seal, Sea-, I., 21.
lepidopodus, *Bipes*, II., 152, 153; *vide* Pygopus lepidopus.
lepidopus, Pygopus, II., 152, 153.
Lepidotrigla Vanessa, I., 5.
Lepralia anceps, I., 35.
Lepralia Botryoides, I., 38; *vide* Schizoporella.
,, Brogniartii, I., 36; *vide* Chorizopora.
,, canaliculata, I., 37; II., 175; *vide* Microporella diadema, var. canaliculata.
,, Cecilii, I., 35; *vide* Schizoporella.
,, (*Cellepora*) megasoma, I., 38; II., 148, 168; *vide* Schismopora.
,, ,, tiara, II., 148, 168; *vide* Schismopora.
,, ,, vitrea, I., 38; II., 148, 168; *vide* Schismopora.
Lepralia, cheilodon, I., 37.
Lepralia ciliata, I., 37; II., 175; *vide* Microporella.
,, circinata, I., 35; *vide* Schizoporella.
,, *crystallina*, I., 35; *vide* Schizoporella Cecilii, I., 35.
,, diadema, I., 37; II., 175; *vide* Microporella.
,, diaphana, I., 35; *vide* Mucronella.
Lepralia elegans, I., 36.
Lepralia Ellerii, I., 37; *vide* Mucronella.
,, excavata, I., 38; *vide* Mucronella.
,, ferox, I., 38; *vide* Hiantopora.
,, hyalina, I., 38; II., 186; *vide* Schizoporella hyalina, var. pellucida.
,, larvalis, I., 37; *vide* Porina.
,, longipora, II., 116; *vide* Cyclicopora.
,, *lunata*, I., 36; II., 175; *vide* Microporella diadema.
,, magnirostris, II., 175; *vide* Tessaradoma.
,, Malusii, I., 36; II., 175; *vide* Microporella.
,, Maplestonei, I., 35; *vide* Schizoporella.
,, marsupium, I., 35; *vide* Porella.
,, monoceros, I., 38; II., 187; *vide* Cribrilina.
,, mucronata, I., 48; *vide* Adeonellopsis (*Eschara*).
Lepralia Pallasiana, I., 36; *vide* L. *pertusa*.
Lepralia papillifera, I., 37; *vide* Porella.
,, pellucida, I., 38; II., 186; *vide* Schizoporella hyalina, var. pellucida.
Lepralia *pertusa*, I., 36; *vide* L. Pallasiana.
,, quadrata, I., 48; *vide Eschara.*
Lepralia schizostoma, I., 38; *vide* Schizoporella.
,, striatula, II., 138; *vide* Gemellipora.
,, subimmersa, I., 35; *vide* Schizoporella.
,, trifolium, I., 37; *vide* Amphiblestrum.
,, vittata, I. 36; *vide* Chorizopora.
leptonyx, *Phoca*, I., 21; *vide* Stenorhynchus.
,, Stenorhynchus, I., 21.
leptorhyncha, Lialis, II., 161; *vide* L. Burtoni.
Lesueri, Physignathus, var. Howitti, I., 81.
,, *Istiurus*, I., 81; *vide* Physignathus.
,, *Lophura*, I., 81; *vide* Physignathus.
leucopsis, *Tiliqua*, II., 191; *vide* Hinulia Whitei.
Lewini, Agarista, I., 8.
Lewin's Day-Moth, I., 8.
Lialis *bicatenata*, II., 161; *vide* L. Burtoni.
,, Burtoni, II., 161.
,, Burton's, II., 161.
,, *leptorhyncha*, II., 161; *vide* L. Burtoni.
,, Lizard, Burton's, II., 161.
,, *punctulata*, II., 161; *vide* L. Burtoni.
Lichenopora bullata, II., 176.
,, magnifica, II., 176.
Lictor Case-Moth, I., 40.
ligulatum, Craspedozoum, II., 177.
Limnodynastes dorsalis, I., 42.
,, Tasmaniensis, I., 42.
lineata Membranipora, I., 26; II., 127; *vide* M. pyrula.
,, *Flustra*, I., 26; II., 127; *vide* Membranipora pyrula.
lineata, Tympanocryptis, II., 181.
Ling, Australian Rock, I., 27.
Lined Aprasia Lizard, II., 162.
lineo-guttatus, Monacanthus, II., 124; *vide* M. Browni.
lipped Snake, White-, I., 11.
lirata, Cellepora, II., 167, 168.
Little Whip-Snake, I., 11.
Lizard, Aprasia, Lined, II., 162.
,, Bearded, II., 121.
,, Blood-sucker, II., 111.
,, Blue-tongue, Sleepy or Northern, I., 72.
,, ,, Southern or Blotched, II., 131.
,, Broad-banded or Occipital Blue-tongue, II., 171.
,, Burton's Lialis, II., 161.
,, Delma, Fischer's False, II., 162.
,, ,, Iguana, I., 41.
,, Gippsland Water Lizard, I., 81.
,, Gould's Monitor, II., 151.
,, Hinulia, Quoy's, II., 191.
,, ,, White's, II., 191.
,, ,, Frazer's, II., 153.
,, Iguana, I., 41.
,, Jew, II., 121.
,, Lace, I., 41.
,, Lined Aprasia, II., 162.
,, Monitor, Gould's, II., 151.
,, *Muricated*, II., 111; *vide* Blood-sucker.
,, Northern Blue-tongued, I., 72.

Moth, Lictor Case-, I., 40.
,, Loranthus Day-, I., 8.
,, Saunders' Case-, I., 40.
,, Vine Day-, I., 8.
mucronata, Adeonellopsis, I., 48; *vide Eschara* (*Lepralia*).
,, *Eschara* (*Lepralia*), I., 48; *vide* Adeonellopsis.
,, *Lepralia*, I., 48; *vide* Adeonellopsis (*Eschara*).
Mucronella diaphana, I., 35; *vide Lepralia.*
,, Ellerii, I., 37; *vide Lepralia.*
,, excavata, I., 38; *vide Lepralia.*
,, lævis, II., 116.
,, *munita*, II., 116; *vide* M. tricuspis.
Mucronella pyriformis, II., 158; *vide* Bracebridgia.
Mucronella tricuspis, II., 116.
,, vultur, II., 116.
Mülleri, Dinolestes, II., 115; *vide* Lanioperca mordax.
multiradiata, Neosphyræna, II., 115; *vide* Lanioperca mordax.
munita (form), Retepora monilifera, var. acutirostris, I., 94, 96.
,, (form), Retepora (monilifera, var. lunata), I., 94, 96.
munita, Mucronella, II., 116; *vide* M. tricuspis.
muricata, Grammatophora, II., 111.
,, *Lacerta*, II., 111; *vide* Grammatophora.
Muricated Lizard, II., 111; *vide* Grammatophora muricata.
Murray Cod-Perch, I., 85, 86.
,, Golden Perch, I., 84.
,, Lobster, I., 15.
,, Tortoise, I., 82, 83.
musica, Œdipoda, II., 110.
musicus, Gryllus, II., 110; *vide* Œdipoda musica.
Mustelus Antarcticus, I., 87.
Myliobatis Australis, I., 63.

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Naja Australis, II., 142; *vide* Pseudechys.
,, *curta*, I., 3; *vide* Hoplocephalus curtus.
nana, Urceolipora, II., 105.
Nautilus, Paper, or Tuberculated Argonaut, I., 61, 62.
Nellia oculata, I., 49.
Neosebastes scorpænoides, II., 193.
Neosphyræna multiradiata, II., 115; *vide* Lanioperca mordax.
neritina, Bugula, I., 59.
Netted Acripeza, II., 129.
nigrescens, *Anilios*, II., 103; *vide* Typhlops.
,, Typhlops, II., 103.
nigroluteus, Cyclodus, II., 131.
,, *Scincus*, II., 131; *vide* Cyclodus.
nitens, Bathypora, II., 106; *vide Membranipora* nitens and Bathypora *porcellana.*
,, Lagenipora, II., 156.
nodosa, Argonauta, I., 61, 62; *vide* A. oryzata.
Northern Blue-tongued Lizard, I., 72.
Notidanus (Heptanchus) Indicus, I., 43.
Novæ-Hollandiæ, Chelodina, I., 92, 93; *vide* C. longicollis.
,, *Hysteropus*, II., 152, 153; *vide* Pygopus lepidopus.
Novæ-Zealandiæ, Delphinus, I., 22.
nudipinnis, Pristiophorus, I., 56.

O.

Oar-Fish, Banks', II., 145.
obesus, Echinorhinus, II., 144; *vide* E. spinosus.
obliqua, *Eschara*, I., 48; *vide* Parmularia.
,, Parmularia, I., 48; *vide Eschara.*
obtecta, Scrupocellaria, II., 126.
Occipital Blue-Tongue Lizard, Broad-banded or, II., 171.
occipitalis, Cyclodus, II., 171.
octogona, Asterias, var., II., 200; *vide* Asterina calcar.
octolineata, Aprasia, II., 162; *vide* A. pulchella.
Octopus raricyathus, I., 61, 62; *vide* Argonauta oryzata.
oculata, Nellia, I., 49.
Ocythoë raricyathus, I., 61, 62; *vide* Argonauta oryzata.
Odontaspis taurus, I., 64.
Œdipoda musica, II., 110.
Officeri, Rhodona, I., 51.
Oiketicus elongatus, I., 40; *vide* Metura elongata.
,, *Saundersi*, I., 40; *vide* Metura elongata.
Oligorus Macquariensis, I., 85, 86.
olivacea Cicada, I., 50; *vide* Cyclochila Australasiæ.
,, Cyclochila, I., 50; *vide* C. Australasiæ.
Ommastrephes Gouldi, II., 169, 170.
Onchopora hirsuta, I., 49; *vide* Tubucellaria.
Opercula of Retepora aurantiaca, I., 94.
,, ,, avicularis, I., 94.
,, ,, carinata, I., 94.
,, ,, fissa, I., 94.
,, ,, formosa, I., 94.
,, ,, granulata, I., 94.
,, ,, monilifera, I., 94.
,, ,, ,, form munita, var. acutirostris, I., 94.
,, ,, ,, form munita, var. lunata, I., 94.
,, ,, ,, var. sinuata, I., 94.
,, ,, ,, form umbonata, I., 94.
,, ,, Phœnicea, I., 94.
,, ,, porcellana, I., 94.
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,, ,, tessellata, I., 94.
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oryzata, Argonauta, I., 61, 62.
Otaria cinerea, I., 31, 71; *vide* Euotaria.

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pachnoides, Schizoporella, II., 186.
Painted-Lady Butterfly, Blue-spotted, II., 198.
Palinurus *Edwardsi*, II., 149, 150; *vide* P. Lalandi.
,, Hügeli, II., 159.
,, Lalandi, II., 149, 150.
,, *Paulensis*, II., 149, 150; *vide* P. Lalandi.
,, *tumidus*, II., 159; *vide* P. Hügeli.
Pallasiana, Lepralia, I., 36; *vide* L. *pertusa*.
Paper-Nautilus, Tuberculated Argonaut, or, I., 61, 62.
Papilio Aganippe, I., 10; *vide* Pieris (Thyca).
,, Harpalyce, I., 9; *vide* Pieris (Thyca).
papillifera, *Lepralia*, I., 37; *vide* Porella.
,, Porella, I., 37; *vide Lepralia*.
papulifera, Biflustra, II., 106.
,, *Membranipora*, II., 106; *vide* Biflustra.
Parmularia obliqua, I., 48; *vide Eschara*.
Parrot-fish, Bleeker's, II., 134.
,, Broad-striped, or Senator, II., 163.
Patagonica, Hippothoa, II., 187; *vide* H. divaricata.
patellaria, *Diachoris*, II., 117; *vide* Amphiblestrum patellarium.
,, *Membranipora*, II., 117; *vide* Amphiblestrum patellarium.
,, *Mollia*, II., 117; *vide* Amphiblestrum patellarium.
patellarium, Amphiblestrum, II., 117.
patina, Diastopora, II., 147.
Paulensis, Palinurus, II., 149, 150; *vide* P. Lalandi.
pectinata, Membranipora, II., 127.
Pedestrian Mid-eyed Locust, II., 139.
pedestris, Mesops, II., 139.
Peeli, *Grystes*, I., 85, 86; *vide* Oligorus Macquariensis.
Pelamyd, Melbourne, II., 155.
Pélamys Schlegeli, II., 155.
pellucida, hyalina var., Schizoporella, I., 38; II., 186; *vide* Lepralia.
,, *Lepralia*, hyalina var., I., 38; II., 186; *vide* Schizoporella.
Pentagonaster (Tosia) aurata, II., 200.
Perca marginata, I., 16, 17; *vide* Arripis truttaceus.
,, *trutta*, I., 16, 17; *vide* Arripis truttaceus.
Perch, Banded Red Gurnet-, I., 33.
,, Gippsland, I., 14.
,, Murray Cod-, I., 85, 86.
,, ,, Golden, I., 84.
,, Spotted Red Gurnet-, II., 193.
percoides, *Scorpæna*, I., 33; *vide* Sebastes.
,, Sebastes, I., 33.
perforata, Catenicella, I., 24.
,, *Membranipora*, I., 25, 36; *vide* Micropora.
,, Micropora, I., 25, 36; *vide Membranipora* id.
perfragilis, Biflustra, I., 57.
Perichæta Gippslandica, I., 7.
permunita, *Membranipora*, II., 106; *vide* Amphiblestrum permunitum.
permunitum Amphiblestrum, II., 106.
Peronii, Ibacus, II., 199.
,, Monacanthus, II., 143.
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,, Leather-jacket, II., 143.
(personata, var.) Microporella ciliata, I., 37; II., 175.
,, ,, Microporella Malusii, II., 175; *vide Lepralia*.
pertusa, Lepralia, I., 36; *vide* L. Pallasiana.
Petralia undata, I., 60.
Phalænoides glycine, I., 8; *vide* Agarista.
Phaneroptera (Ephippitytha) trigintiduogutata, II., 120.
,, valida, II., 119.
Phasma, Red-shouldered, I., 69, 70.
,, Large Pink-winged, I., 80.
Phasma violascens, I., 79; *vide* Acrophylla.
Phasma, Violet-shouldered, I., 69, 70.
,, Violet-winged, I., 79.
Phillipi, *Cestracion*, II., 113; *vide* Heterodontus.
,, Heterodontus, II., 113.
,, *Squalus*, II., 113; *vide* Heterodontus.
Phoca leptonyx, I., 21; *vide* Stenorhynchus.
Phœnicea, Retepora, I., 94, 98.
Phyllopteryx altus, I., 65.
,, foliatus, I., 65.
Phyllurus Miliusii, II., 132.
Physignathus Lesueri, var. Howitti, I., 81.
Picked Dog-Fish, I., 75.
pictus, *Gryllus*, II., 110; *vide* Œdipoda musica.
Pieris (Thyca) Aganippe, I., 10.
,, ,, Harpalyce, I., 9.
Pike, Saury, II., 135.
,, Skipjack, II., 115.
pilosa, Electra, I., 25; *vide Membranipora*.
,, *Flustra*, I., 25; *vide* Electra.
,, *Membranipora*, I., 25; *vide* Electra.
Pink-winged Phasma, Large, I., 80.
pisciformis, Carbasea, I., 45.
plagiostoma, Catenicella, I., 24.
,, ,, var. lævis, I., 24.
,, ,, var. setigera, I., 24.
Plain Whiting, II., 182.
platalea, Adeonella, I., 48; *vide Eschara*.
,, *Cellepora*, II., 148, 168; *vide* Schismopora.
,, *Eschara*, I., 48; *vide* Adeonella.
,, Schismopora, II., 148, 168; *vide Cellepora*.
Platemys, Macquaria, I., 82, 83; *vide* Chelymys.
plumbeus, *Scomber*, II., 183; *vide* Temnodon saltator.
pneumatophorus, Scomber, I., 28.
Podacanthus typhon, I., 80.
Pœcilopora anomala, II., 156.
polita, *Membranipora*, II., 106; *vide* Pyripora.
,, Pyripora, II., 106.
ponderosa, *Catenicella*, II., 107; *vide* Calpidium ponderosum.
ponderosum, Calpidium, II., 107.
porcata, *Dermatochelys*, II., 101; *vide* Sphargis coriacea.
porcellana, Bathypora, II., 106; *vide* B. nitens.
,, *Membranipora*, II., 106; *vide* Bathypora.
porcellana Retepora, I., 94, 95.

Lizard, Pygopus, II., 152, 153.
,, . Quoy's Hinulia, II., 191.
,, Shingle-back, Rugged Stump-tail, or, II., 102.
,, Sleepy, Northern Blue-tongue, or, I., 72.
,, ,, Southern Blotched Blue-tongue, or, II., 131.
,, Southern, or Blotched Blue-tongue, II., 131.
,, Spiny-ridged, II., 141.
,, Stump-tail, Rugged, or Shingle Back, II., 102.
,, Water-, Gippsland, I., 81.
,, White's Hinulia Lizard, II., 191.
,, White-streaked Earless, II., 181.
lobatus, Squalus, I., 43; *vide* Crossorhinus barbatus.
Lobster, Murray, I., 15.
,, Southern Rock, II., 149, 150.
,, Southern Spiny (Melbourne Craw-fish), II., 149, 150.
,, Sydney Spiny, or Sydney Craw-fish, II., 159.
Locust, Australian Yellow-winged, II., 110.
,, Cinnamon Keel-backed, II., 140.
,, Dusky Flat-horned, II., 139.
,, Pedestrian Mid-eyed, II., 139.
Locusta vigentissima, II., 109.
Long-fingered Chilodactylus, II., 173, 174.
longicollis, Chelodina, I., 92, 93.
,, *Testudo*, I., 92, 93; *vide* Chelodina.
longipora, Cyclicopora, II., 116.
,, *Lepralia*, II., 116; *vide* Cyclicopora.
longirostris, Rhynchopora, II., 196.
(longispina, var.), diadema, Microporella, II., 175.
Long-necked River Tortoise, I., 92, 93.
Long-tailed Shark, Thresher or, I., 88.
Long-toothed Bull Shark, or Shovel-nosed Shark, I., 64.
Lophura, Istiurus, I., 81; *vide* Physignathus Lesueri, var. Howitti.
,, Lesueri, I., 81; *vide* Physignathus Lesueri, var. Howitti.
Loranthus Day-Moth, I., 8.
lorica, Catenicella, I., 24.
Lotella callarias, I. 19.
lucida, Callymmophora, II., 105; *vide* Urceolipora nana.
Ludrick, I., 73.
lunata, Lepralia, I., 36; II., 175; *vide* Microporella diadema.
lunata (var.), Retepora monilifera, form munita, I., 94, 96.
(lunipuncta, var.), diadema, Microporella, II., 175.
Luth, or Leathery Turtle, II., 101.
Lygosoma molinigera, II., 191; *vide* Hinulia Whitei.
,, Quoyi, II., 191, *vide* Hinulia.
lyra, Testudo, II., 101; *vide* Sphargis coriacea.

M.

Maccoyi, Thynnus, I., 44; *vide* T. thynnus.
Mackerel, Commerson's, II., 154.
,, Horse, I., 18.
,, Southern, I., 28.
Macquaria, Chelymys, I., 82, 83.
,, *Emys*, I., 82, 83; *vide* Chelymys.
,, *Platemys*, I., 82, 83; *vide* Chelymys.
Macquariensis, Ctenolates, I., 84; *vide* C. ambiguus.
Macquariensis, Oligorus, I., 85, 86.
,, *Grystes*, I., 85, 86; *vide* Oligorus.
Macleayi, Heteroscarus, II., 164.
Macleay's Wrasse, II., 164.
maculata Ephippitytha, II., 120; *vide* Phaneroptera (Ephippitytha) trigintiduoguttata.
Magellanica, Beania, I., 46; *vide Diachoris*.
,, *Diachoris*, I., 46; *vide* Beania.
magnifica, Lichenopora, II., 176.
magnilabris, *Membranipora*, I., 60; *vide* Steganoporella.
,, Steganoporella, I., 60.
magnirostris Cellepora, II., 167, 168.
,, *Lepralia*, II., 175; *vide* Tessaradoma.
,, *Porina*, II., 175; *vide* Tessaradoma.
,, Tessaradoma, II., 175.
malleus, Zygæna, I., 56.
Malusii, *Lepralia*, I., 36; II., 175; *vide* Microporella.
,, Microporella, I., 36; II., 175; *vide Lepralia*.
,, var. personata, Microporella, II., 175; *vide Lepralia*.
,, var. thyreophora, Microporella, II., 175; *vide* Lepralia.
mamillaris, *Membranipora*, I., 25; II., 196; *vide* Thairopora.
,, Thairopora, I., 25; II., 196; *vide Membranipora*.
Manna Cicada, Great Black or, I., 50.
Mantis, Broad-styled, II., 130.
,, latistylus, II., 130.
Maplestonia cirrata, II., 126.
Maplestonei, *Lepralia*, I., 35; *vide* Schizoporella.
,, Schizoporella, I., 35; *vide Lepralia*.
Marbled Gecko, II., 132.
margaritacea, Catenicella, I., 24.
marginata, Perça, I., 16, 17; *vide* Arripis truttaceus.
marmoratus, Diplodactylus, II., 132.
Marsh-Frog, Spotted, I., 42.
marsupiata, Retepora, I., 94, 95; *vide* R. fissa.
marsupium, *Lepralia*, I., 35; *vide* Porella.
,, Porella, I., 35; *vide Lepralia*.
marsupium, Schizoporella, II., 138; *vide* S. Ridleyi.
maxima, Selache, II., 104; *vide* Cetorhinus maximus.
maximus, Cetorhinus, II., 104.
,, *Squalus*, II., 104; *vide* Cetorhinus.
Megascolides Australis, I., 7.
megasoma, *Cellepora (Lepralia)*, I., 38; II., 148, 168; *vide* Schismopora.
,, Schismopora, I., 38; II., 148, 168; *vide Cellepora (Lepralia)*.
melanochir, Hemiramphus, II., 135; *vide* H. intermedius.
Melbourne Crawfish, II., 149, 150.
,, Pelamyd, II., 155.
,, Sepia or Cuttle-Fish, Large, II., 188, 189, 190.

membranacea, *Flustra*, I., 25; *vide* Membranipora.
,, Membranipora, I., 25.
Membranipora *acifera*, II., 127; *vide* M. serrata.
Membranipora amplectens, II., 187; *vide* Electra.
,, bimamillata, II., 106; *vide* Biflustra.
,, catenularia, II., 106; *vide* Pyripora.
,, cervicornis, I., 25; *vide* Amphiblestrum.
,, *ciliata*, I., 25; II., 127; *vide* Amphiblestrum ciliatum
Membranipora corbula, II., 127.
Membranipora coriacea, II., 196; *vide* Micropora.
,, dispar, I., 26; *vide* Thairopora.
,, flagellum, II., 106; *vide* Electra.
Membranipora inarmata, II., 127.
,, Lacroixii (?), I., 26.
,, *lineata*, I., 26; II., 127; *vide* M. pyrula.
Membranipora magnilabris, I., 60; *vide* Steganoporella.
,, mamillaris, I., 25; II., 196; *vide* Thairopora.
Membranipora membranacea, I., 25.
Membranipora nitens, II., 106; *vide* Bathypora (*porcellana*) nitens.
,, papulifera, II., 106; *vide* Biflustra.
,, *patellaria*, II., 117; *vide* Amphiblestrum patellarium.
Membranipora pectinata, II., 127.
Membranipora perforata, I., 25, 36; *vide* Micropora.
,, *permunita*, II., 106; *vide* Amphiblestrum permunitum.
,, pilosa, I., 25; *vide* Electra.
,, polita, II., 106; *vide* Pyripora.
,, *porcellana*, II., 106; *vide* Bathypora nitens.
Membranipora pyrula, I., 26; II., 127; *vide* M. *lineata*.
Membranipora radicifera, II., 117; *vide* Beania.
,, *roborata*, II., 177; *vide* Craspedozoum roboratum.
,, *Rosselii*, I., 26; *vide* Amphiblestrum bursarium.
Membranipora serrata, II., 127.
,, spinosa, II., 127.
Membranipora umbonata, I., 26; *vide* Amphiblestrum umbonatum.
,, Woodsii, I., 26; *vide* Thairopora.
Membraniporella distans, II., 187.
membraniporides, *Flustra*, II., 177; *vide* Craspedozoum roboratum.
Menipea *benemunita*, (?) II., 177; *vide* M. funiculata.
,, Buskii, I., 58.
,, cervicornis, I., 58.
,, crystallina, I., 58.
,, cyathus, I., 58.
,, funiculata, II., 177.
,, tricellata, I., 58.
mercurialis, Sphargis, II., 101; *vide* S. coriacea.
mercurii, Sphargis, II., 101; *vide* S. coriacea.
Mesops pedestris, II., 139.
Metura elongata, I., 40.
microlepidota, Diemenia, I., 23.
Micropora coriacea, II., 196.
,, perforata, I., 25, 36; *vide Membranipora*.
Microporella canaliculata (var.), diadema, I., 37; II., 175; *vide Lepralia canaliculata*.
,, ciliata, I., 37; II., 175; *vide Lepralia*.
,, ,, var. personata, II., 175.
,, ,, ,, spicata, II., 175.
,, diadema, I., 37; II., 175; *vide Lepralia*.
,, ,, var. canaliculata, I., 37; II., 175; *vide Lepralia* canaliculata.
,, ,, ,, lata, II., 175.
,, ,, ,, longispina, II., 175.
,, ,, ,, lunipuncta, II., 175.
,, lata (var.), diadema, II., 175.
,, longispina (var.), diadema, II., 175.
,, lunipuncta (var.), diadema, II., 175.
,, Malusii, I., 36; II., 175; *vide Lepralia*.
,, ,, var. personata, II., 175.
,, ,, ,, thyreophora, II., 175.
,, renipuncta, II., 175.
,, scandens, II., 175.
Microporella stellata, II., 175; *vide* Escharipora.
Mid-eyed Locust, Pedestrian, II., 139.
Milesi, Aulopus, I., 54, 55; *vide* A. purpurisatus.
Miliusii, Phyllurus, II., 132.
Milneana, Idmonea, I., 68.
mirabilis, Beania, II., 116.
mœrens, Cicada, I., 50.
molinigera, *Lygosoma*, II., 191; *vide* Hinulia Whitei.
Mollia patellaria, II., 117; *vide* Amphiblestrum patellarium.
Mölleri, Delma, II., 153; *vide* D. Frazeri.
Monacanthus Browni, II., 124.
,, Hippocrepis, II., 125.
,, *lineoguttatus*, II., 124; *vide* M. Browni.
,, Peronii, II., 143.
monilifera, Retepora, I., 94, 96, 97.
,, ,, form munita, var. acutirostris, I., 94, 96.
,, ,, form munita, var. lunata, I., 94, 96.
,, ,, var. sinuata, I., 94, 96.
,, ,, form umbonata, I., 94, 97.
Monitor Gouldi, II., 151.
Monitor Lizard, Gould's, II., 151.
monoceros, Cribrilina, I., 38; II., 187; *vide Lepralia*.
,, *Lepralia*, I., 38; II., 187; *vide* Cribrilina.
mordax, Lanioperca, II., 115.
Morelia variegata, I., 13.
Moth, Goat-, Large Wattle, I., 30.
,, Lewin's Day-, I., 8.

Sebastes percoides, I., 33.
Selache maxima, II., 104; *vide* Cetorhinus maximus
Senator Parrot-fish, Broad-striped, or, II., 163.
Sepia apama, II., 188, 189, 190.
,, or Cuttle-fish, Large Melbourne, II., 188, 189, 190.
Sepioteuthis Australis, I., 76, 77.
Sergeant Baker, I., 54, 55.
Serialaria Australis, II., 185; *vide* Amathia.
,, *spiralis*, II., 185; *vide* Amathia bicornis.
Seriola *aureo-vittata*, II., 172; *vide* S. Lalandi.
,, *grandis*, II., 172; *vide* S. Lalandi.
,, Lalandi, II., 172.
serrata, Membranipora, II., 127.
,, Retepora, I., 94, 99.
serratirostris, Cellepora, II., 128, 168.
serratus, *Astacoides*, I., 15; *vide* Astacopsis.
,, Astacopsis, var. Yarraensis, II., 160.
,, *Cancer*, I., 15; *vide* Astacopsis.
,, *Potamobius*, I., 15; *vide* Astacopsis.
setigera, Catenicella, var., I., 24; *vide* C. plagiostoma.
setirostris, Cribrilina, II., 187.
setosa, Crisia, I., 39.
Seven-gilled Shark, I., 43.
Shark, Australian Tope, I., 64.
,, Basking, II., 104.
,, Bull-dog, or Port Jackson, II., 113.
,, Bull-, Long-toothed, I., 64.
,, Carpet, I., 43.
,, Hammer-headed, I., 56.
,, Long-tailed, or Thresher, I., 88.
,, Port Jackson, or Bull-dog, II., 113.
,, Seven-gilled, I., 43.
,, Shovel-nosed Bull-, I., 64.
,, Spinous, II., 144.
,, Thresher, or Long-tailed, I., 88.
,, Tope, Australian, I., 64.
,, White, I., 74.
Shavianus, Cetorhinus, II., 104; *vide* C. maximus.
Shield-fronted Brown Snake, I., 23.
Shield Star, Twelve-plated, II., 200.
Shingle-back, or Rugged Stump-tail, Lizard, II., 102
Short-headed Sea-Horse, I., 65.
Shovel-nosed Shark, or Long-toothed Bull-Shark, I., 64.
Sillago ciliata, II.. 182.
Silver Ribbon-fish, Southern, II., 122.
simplex, Cellepora, II., 165, 168.
,, *Crenidens*, I., 73; *vide* Girella.
,, Didymia, I. 46.
,, Farciminaria, II., 158.
,, Girella, I., 73.
simplex, *Salicornaria*, II., 105; *vide* Cellaria rigida.
sincoides, *Lacerta*, I., 72; *vide* Cyclodus gigas.
sinuata (var.), Retepora monilifera, I., 94, 96.
Skipjack, II., 183.
Skipjack Pike, II., 115.
Sleepy Lizard, Northern Blue-tongue, or, I., 72.
,, ,, Southern, or Blotched Blue-tongue, II., 131.
Smaller Green Gum-tree Grasshopper, II., 119.
Small-scaled Brown Snake, I., 23.
,, Rock Cod, I., 19.
Smooth-Hound, Australian, I., 87.
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,, Black- and White-Ringed, I., 52.
,, Blackish Australian Worm-, II., 103.
,, Brown, Common, I., 23.
,, ,, Shield-fronted, I., 23.
,, Brown, Small-scaled, I., 23.
,, Carpet, I., 13.
,, Common Brown, I., 23.
,, Copper-head, I., 2.
,, Furina-, Two-hooded, I., 32.
,, Little Whip-, I., 11.
,, Pseudechys, Brown, II., 142.
,, Shield-fronted Brown, I., 23.
,, Small-scaled Brown, I., 23.
,, Tiger, I., 3.
,, Two-hooded Furina-, I., 32.
,, Whip-, Little, I., 11.
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,, Worm-, Blackish Australian, II., 103.
sordida, Opsomala, II., 139.
Southern, or Blotched, Blue-tongue Lizard, II., 131.
,, Chimæra, II., 112.
,, Mackerel, I., 28.
,, Rock Lobster, II., 149, 150.
,, Silver Ribbon-fish, II., 122.
,, Spiny Lobster, II., 149, 150.
speciosa, Cellepora, II., 128.
Sphargis coriacea, II., 101.
,, *mercurialis*, II., 101; *vide* S. coriacea.
,, *mercurii*, II., 101; *vide* S. coriacea.
,, *tuberculata*, II., 101; *vide* S. coriacea.
spicata, Cellepora, II., 165, 168.
,, Dimetopia, I., 46.
(spicata, var.) ciliata, Microporella, I., 37; II., 175; *vide Lepralia.*
spicatum, Craspedozoum, II., 177.
spinifer, Astacoides, I., 15; *vide* A. serratus.
spinigera, Beania, I., 46; *vide Diachoris.*
,, *Diachoris*, I., 46; *vide* Beania.
spinosa, Membranipora, II., 127.
spinosus, Echinorhinus, II., 144.
,, *Squalus*, II., 144; *vide* Echinorhinus.
Spinous Shark, II., 144.
,, Lobster, Southern, II., 149, 150.
Spiny Cray-fish, Yarra, II., 160.
,, Lobster, Southern, or Melbourne Craw-fish, II., 149, 150.
,, ,, Sydney (Sydney Craw-fish), II., 159.
,, Ridged Lizard, II., 141.
,, Sided Butterfly-Gurnard, I., 5.
Spiralaria florea, I., 46.
spiralis, Amathia, II., 185.
spiralis, *Serialaria*, II., 185; *vide* Amathia bicornis.
Spotted Eagle-Ray, Blue-, I., 63.
,, Grasshopper, Thirty-two, II., 120.
,, Marsh-Frog, I., 42.
,, Painted-Lady Butterfly, Blue-, II, 198.
,, Red Gurnet-Perch, II., 193.
Squalus acanthias, I., 75; *vide* Acanthias vulgaris.
,, *appendiculatus*, I., 43; *vide* Crossorhinus barbatus.
,, barbatus, I., 43; *vide* Crossorhinus.

Squalus lobatus, I., 43; *vide* Crossorhinus barbatus.
,, maximus, II., 104; *vide* Cetorhinus.
,, Phillipi, II., 113; *vide* Heterodontus.
,, spinosus, II., 144; *vide* Echinorhinus.
,, squatina, I., 34; *vide* Rhina.
,, vulpes, I., 88; *vide* Alopecias.
,, *zygæna*, I., 56; *vide* Zygæna malleus.
squamiceps, Pygopus, II., 152, 153; *vide* P. lepidopus.
squatina, Rhina, I., 34.
,, *Squalus*, I., 34; *vide* Rhina.
Squid, Gould's, II., 169, 170.
Star-fish, Eight-rayed Cushion, II., 200.
,, Gunn's Cushion, II., 200.
,, Twelve-plated Shield, II., 200.
Steganoporella *elegans*, I., 60; *vide* S. magnilabris.
Steganoporella Jervoisii, II., 196; *vide* Thairopora.
Steganoporella magnilabris, I., 60.
stellata, Escharipora, II., 175.
,, *Microporella*, II., 175; *vide* Escharipora.
Stenorhynchus leptonyx, I., 21.
Stirparia annulata, I., 59.
,, glabra, II., 195.
Stomatopora geminata, II., 176.
Streaked Earless Lizard, White-, II., 181.
striatula, Gemellipora, II., 138.
,, *Lepralia*, II., 138; *vide* Gemellipora.
Striped Parrot-fish, Broad-, or Senator, II., 163.
Stump-tail, or Shingle-back Lizard, Rugged, II., 102.
subimmersa, *Lepralia*, I., 35; *vide* Schizoporella.
,, Schizoporella, I., 35; *vide Lepralia*.
subsinuata, Schizoporella, II., 138.
superbus, Hoplocephalus, I., 2.
superciliosa, Diemenia, I., 23.
superciliosus, *Pseudoelaps*, I., 23; *vide* Diemenia superciliosa.
Sydney Craw-fish or Spiny Lobster, II., 159.
Syngnathus foliatus, I., 65; *vide* Phyllopteryx.
,, *tæniolatus*, I., 65; *vide* Phyllopteryx foliatus.

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tænia, Trachypterus, II., 122.
tæniolatus, Syngnathus, I., 65; *vide* Phyllopteryx foliatus.
Tasmanicus, *Centropristes*, I., 16, 17; *vide* Arripis truttaceus.
Tasmaneus, Callorhynchus, II., 112; *vide* C. Antarcticus.
Tasmaniensis, Limnodynastes, I., 42.
taurus, *Carcharias*, I., 64; *vide* Odontaspis.
,, Odontaspis, I., 64.
Temnodon *heptacanthus*, II., 183; *vide* T. saltator.
,, saltator, II., 183.
tenuirostris, Cellaria, I., 49.
,, *Salicornaria*, I., 49; *vide* Cellaria.
tenuis, Canda, II., 136.
,, Crisia, I., 39.
Tessaradoma magnirostris, II., 175.
tessellata, Retepora, I., 94, 99.
Testudo coriacea, II., 101; *vide* Sphargis.
Testudo longicollis, I., 92, 93; *vide* Chelodina.
,, *Lyra*, II., 101; *vide* Sphargis coriacea.
Tettigonia Australasiæ, I., 50; *vide* Cyclochila.
Thairopora armata, II., 196.
,, dispar, I., 26; *vide Membranipora*.
,, Jervoisii, II., 196.
,, mamillaris, I., 25; II., 196; *vide Membranipora*.
,, Woodsii, I., 26; *vide Membranipora*.
Thersites *altivelis*, I., 44; *vide* T. atun.
,, atun, I., 44.
Thick-tailed Gecko, II., 132.
Thirty-two Spotted Grasshopper, II., 120.
Thresher or Long-tailed Shark, I., 88.
(Thyca) Pieris Aganippe, I., 10.
,, ,, Harpalyce, I., 9.
Thynnus *Maccoyi*, I., 44; *vide* T. thynnus.
,, *Scomber*, I., 44; *vide* Thynnus.
,, thynnus, I., 44.
,, *vulgaris*, I., 44; T. thynnus.
(thyreophora, var.), Malusii, Microporella, II., 175; *vide Lepralia*.
tiara, *Cellepora*, II., 148, 168; *vide* Schismopora.
,, Schismopora, II., 148, 168; *vide Cellepora*.
tigerinus, Genypterus, I., 27; *vide* G. Australis.
Tiger Snake, I., 3.
Tiliqua leucopsis, II., 191; *vide* Hinulia Whitei.
Toad-fish, Two-pronged, II., 123.
Tooth-brush Leather-jacket, Brown's, II., 124.
Tooth-cupped Cuttlefish, I., 76, 77.
Tope Shark, Australian, I., 64.
Tortoise, Long-necked River, I., 92, 93.
,, Murray, I. 82, 83.
tortuosa, Amathia, II., 185.
(Tosia) Pentagonaster aurata, II., 200.
Trachichthys Australis, II., 114.
Trachinops, Blotch-tailed, II., 194.
,, caudimaculatus, II., 194.
trachurus, *Caranx*, I., 18; *vide* Trachurus trachurus.
,, *Scomber*, I., 18; *vide* Trachurus trachurus.
Trachurus trachurus, I., 18.
Trachydosaurus rugosus, II., 102.
Trachypterus *falx*, II., 122; *vide* T. tænia.
,, *iris*, (?) II., 122; *vide* T. tænia.
,, tænia, II., 122.
triangula, Schizoporella, II., 138.
tricellata, Menipea, I., 58.
tricuspis, Mucronella, II., 116.
tridenticulata, Cellepora, II., 128.
trifolium, Amphiblestrum, I., 37; *vide Lepralia*.
,, *Lepralia*, I, 37; *vide* Amphiblestrum.
trigintiduoguttata, Phaneroptera (Ephippitytha), II., 120.
Trigla kumu, I., 6.
Tropidoderus iodomus. I., 69, 70.
,, rhodomus, I., 69, 70.
Tropinotus Australis, II., 140.
,, *cinnamonicus*, II., 140; *vide* T. Australis.
Trout, Salmon, I., 16, 17.
trutta, *Perca*, I., 16, 17; *vide* Arripis truttaceus.
truttaceus, Arripis, I., 16, 17.
,, *Centropristes*, I., 16, 17; *vide* Arripis.
tuba, Bicellaria, I., 59.
tubaria, *Cidarites*, I., 100; *vide* Goniocidaris.

porcellana, Retepora, var. laxa, I., 94, 95.
Porella marsupium, I., 35; *vide Lepralia.*
,, papillifera, I., 37; *vide Lepralia.*
Porina gracilis, I., 48; *vide Eschara.*
,, larvalis, I., 37; *vide Lepralia.*
Porina magnirostris, II., 175; *vide* Tessaradoma.
porphyriacus *Coluber*, I., 1; *vide* Pseudechys.
,, Pseudechys, I., 1.
Port Jackson, or Bull-dog Shark, II., 103.
Potamobius serratus, I., 15; *vide* Astacopsis.
prælonga, Cyclicopora, II., 116; *vide* C. longipora.
Pristiophorus nudipinnis, I., 56.
profunda, Rhynchopora, II., 196; *vide* R. longirostris.
prolifera, Cellepora, II., 166, 168.
pronged Toad-fish, Two-, II., 123.
Pseudechys Australis, II., 142.
,, Snake, Brown, II., 142.
,, porphyriacus, I., 1.
Pseudocarcinus gigas, II., 179, 180.
Pseudodelma impar, II., 162.
Pseudoelaps superciliosus, I., 23; *vide* Diemenia superciliosa.
Pseudophysis barbatus, I., 20.
pulchella, Aprasia, II., 162.
,, Catenicella, I., 89.
pulcherrima, Schizoporella, II., 186.
pulchra, Claviporella, II., 146.
punctigera, Schizoporella, II., 138.
punctigerum, Amphiblestrum, II., 106.
punctulata, Lialis, II., 161; *vide* L. Burtoni.
purpurisatus, Aulopus, I., 54, 55.
pusilla, Catenicellopsis, II., 107.
pygmæa, Flosculipora, II., 176.
Pygopus lepidopus, II., 152, 153.
,, Lizard, II., 152, 153.
,, *squamiceps*, II., 152, 153; *vide* P. lepidopus.
Pyrameis Kershawi, II. 198.
,, Itea, II., 198.
pyriformis, Bracebridgia, II., 158.
,, *Mucronella*, II., 158; *vide* Bracebridgia.
Pyripora catenularia, II., 106.
,, crassa, II., 106.
,, polita, II., 106.
pyrula, Membranipora, I., 26; II., 127; *vide* M. *lineata.*

Q.

quadrata, *Eschara*, I., 48; *vide* Lepralia.
,, Lepralia, I., 48; *vide Eschara.*
Quoy's Hinulia Lizard, II., 191.
Quoyi, Hinulia, II., 191.
,, *Lygosoma*, II., 191; *vide* Hinulia.

R.

radians, Idmonea, I., 68.
radiata, Cribrilina, II., 187.
radicifera, Beania, II., 117.
,, *Membranipora*, II., 117; *vide* Beania.
ramosa, Fasciculipora, II., 157.
Rana aurea, I., 53; *vide* Ranoidea.
Ranoidea aurea, I., 53.
,, *Jacksoniensis*, I., 53; *vide* R. aurea.
raricyathus, Octopus, I., 61, 62; *vide* Argonauta oryzata.
,, *Ocythoë*, I., 61, 62; *vide* Argonaut oryzata.
Ray, Eagle-, Blue-spotted, I., 63.
Rayi, Brama, II., 133.
Ray's Sea-Bream, II., 133.
recta, Ætea, II., 178.
Red Gurnet-Perch, Banded, I., 33.
,, ,, ,, Spotted, II., 193.
Red King Crab, Great, II., 179, 180.
Red-shouldered Phasma, I., 69, 70.
Regalecus Banksi, II., 145.
,, *Glesne*, II., 145; *vide* R. Banksi.
renipuncta, Microporella, II., 175.
Retepora aurantiaca, I., 94, 98.
,, avicularis, I., 94, 95.
,, carinata, I., 94, 97.
,, fissa, I., 94, 95.
,, formosa, I., 94, 97.
,, granulata, I., 94, 99.
,, laxa (var.), porcellana, I., 94, 95.
,, *marsupiata* (?), I., 94, 95; *vide* R. fissa.
,, monilifera, I., 94, 96, 97.
,, ,, form munita, var. acutirostris, I., 94, 96.
,, ,, form munita, var. lunata, I., 94, 96.
,, ,, var. sinuata, I., 94, 96.
,, ,, form umbonata, I., 94, 97.
,, Phœnicea, I., 94, 98.
,, porcellana, I., 94, 95.
,, ,, var. laxa, I., 94, 95.
,, *robusta*, I., 94, 95; *vide* R. porcellana.
,, ,, I., 94, 95; *vide* R. porcellana, var. laxa.
,, serrata, I., 94, 99.
,, tessellata, I., 94, 99.
,, (umbonata, form) monilifera, I., 94, 97.
reticulata, Acripeza, II., 129.
Retihornera foliacea, II., 118; *vide* Hornera.
Rhabdozoum Wilsoni, II., 178.
Rhina squatina, I., 34.
rhodomus, Tropidoderus, I., 69, 70.
Rhodona Officeri, I., 51.
,, Victorian, I., 51.
Rhynchopora bispinosa, II., 196.
,, longirostris, II., 196.
,, *profunda*, II., 196; *vide* R. longirostris.
Ribbon-fish, Southern Silver, II., 122.
Ridleyi, Schizoporella, II., 138.
rigida, Cellaria, II., 105.
Ringed Snake, Black- and White-, I., 52.
ringens, Catenicella, II., 178.
River Tortoise, Long-necked, I., 92, 93.
roborata, Membranipora, II., 177; *vide* Craspedozoum roboratum.
roboratum, Craspedozoum, II., 177; *vide Membranipora roborata.*
robusta, Bugula, I, 78.
,, Hornera, II., 118.
robusta, Retepora, I., 94, 95; *vide* R. porcellana, and var. laxa.
Rock Cod, Australian, I., 20.

Rock Cod, Small-scaled, I., 19.
Rockling, Australian, I., 27.
Rock Lobster, Southern, II., 149, 150.
Rondeletii, Carcharodon, I., 74.
roseipennis, *Diura*, I., 79; *vide* Acrophylla violascens.
Rosselii, *Membranipora*, I., 26; *vide* Amphiblestrum bursarium.
rostrata, Schizoporella, II., 186.
rota, *Cellepora*, II., 148; *vide* Schismopora.
,, Schismopora, II., 148; *vide Cellepora.*
Rough Fish, Australian, II., 114.
Roughy, II., 184.
rudis, Caberea, II., 136.
rufa, Catenicella, I., 24.
Rugged Stump-tail, or Shingle-back Lizard, II., 102.
rugosus, Trachydosaurus, II., 102.
Rüppelli, Typhlops, II., 103; *vide* T. nigrescens.

S.

salar, *Centropristes*, I., 16, 17; *vide* Arripis truttaceus.
Salicornaria farciminoides, I., 49; *vide* Cellaria (*fistulosa*) Australis.
,, gracilis, I., 49; *vide* Cellaria.
,, hirsutâ, I., 49; *vide* Cellaria.
,, *simplex*, II., 105; *vide* Cellaria rigida.
,, tenuirostris, I., 49; *vide* Cellaria.
Salmon Arripis, I., 16, 17.
,, Trout, I., 16, 17.
saltator, Temnodon, II., 183.
saltatrix, *Gasterosteus*, II., 183; *vide* Temnodon saltator.
Sand-Frog, Common, I., 42.
Sarniensis, Diastopora, II., 147.
Saturnia Laplacei, II., 197; *vide* Chelepteryx Collesi.
Saunders' Case-Moth, I., 40.
Saundersi, *Oiketicus*, I., 40; *vide* Metura elongata.
saurus, *Esox*, II., 135; *vide* Scomberesox saurus, var. Forsteri.
,, Scomberesox, var. Forsteri, II., 135.
Saury Pike, II., 135.
Saw-Fish, Common Australian, I., 56.
scandens, Microporella, II., 175.
scaled, Small-, Rock Cod, I., 19.
Schismopora benemunita, II., 148, 168; *vide Cellepora.*
,, costata, II., 148, 168; *vide Cellepora.*
,, Costazei, var., II., 148; *vide Cellepora.*
,, glomerata, II., 148, 168; *vide Cellepora.*
,, megasoma, I., 38; II., 148, 168; *vide Cellepora.*
,, platalea, II., 148, 168; *vide Cellepora.*
,, rota, II., 148; *vide Cellepora.*
,, tiara, II., 148, 168; *vide Cellepora.*
,, vitrea, I., 38; II., 148, 168; *vide Cellepora.*
Schizoporella arachnoides, II., 138.
,, biturrita, II., 186.
,, Botryoides, I., 38; *vide Lepralia.*
,, Cecilii, I., 35; *vide Lepralia.*
,, circinata, I., 35; *vide Lepralia.*
,, *controversa*, II., 138; *vide* S. dædala.
,, cryptostoma, II., 138.
,, dædala, II., 138.
,, hyalina, var. pellucida, I., 38; II., 186; *vide Lepralia* hyalina.
,, ,, var. cornuta, II., 186.
,, ,, var. incrassata, II, 186.
,, ,, tuberculata, II., 186.
,, lata, II., 138.
,, latisinuata, II., 186.
,, Maplestonei, I., 35; *vide Lepralia.*
,, *marsupium*, II., 138; *vide* S. Ridleyi.
,, pachnoides, II., 186.
,, (pellucida, var.) hyalina, I., 38; II., 186.
,, pulcherrima, II., 186.
,, punctigera, II., 138.
,, Ridleyi, II., 138.
,, rostrata, II., 186.
,, schizostoma I., 38; *vide Lepralia.*
,, subimmersa, I., 35; *vide Lepralia.*
,, subsinuata, II., 138.
,, triangula, II., 138.
,, Woosteri, II., 186.
schizostoma, *Lepralia*, I., 38; *vide* Schizoporella.
,, Schizoporella, I., 38; *vide Lepralia.*
Schlegeli, Pelamys, II., 155.
Scincus nigroluteus, II., 131; *vide* Cyclodus.
,, gigas, I., 72; *vide* Cyclodus.
,, *Whitei*, II., 191; *vide* Hinulia.
Scomber Commersoni, II., 154; *vide* Cybium.
Scomberesox *Camperi*, II., 135; *vide* S. saurus, var. Forsteri.
,, Forsteri (?), II., 135; *vide* S. saurus, var. Forsteri.
,, saurus, var. Forsteri, II., 135.
Scomber plumbeus, II., 183; *vide* Temnodon saltator.
Scomber pneumatophorus, I., 28.
Scomber thynnus, I., 44; *vide* Thynnus.
,, trachurus, I., 18; *vide* Trachurus trachurus.
Scorpæna percoides, I., 33; *vide* Sebastes id.
scorpænoides, Neosebastes, II., 193.
Scruparia chelata, II., 178.
scrupea, Scrupocellaria, II., 126.
Scrupocellaria cervicornis, II., 126.
,, cyclostoma, II., 126.
,, obtecta, II., 126.
,, ornithorhynchus, II., 126.
,, scrupea, II., 126.
Sea-Bear or Fur-Seal, I., 31, 71.
Sea Bream, Ray's, II., 133.
Sea-Dragon, Leafy, I., 65.
Sea Gar-fish, Black-finned Half-beak, or, II., 135.
Sea-Horse, Short-headed, I., 65.
,, Leopard Seal, I., 21.
Seal, Fur-, Sea-Bear or, I., 31, 71.
,, Sea-Leopard, I., 21.

tubaria, Goniocidaris, I., 100.
tuberculata, Argonauta, I., 61, 62; *vide* A. oryzata.
tuberculata, Lagenipora, II., 156.
,, var., Schizoporella, II., 186; *vide* S. hyalina.
tuberculata, Sphargis, II,, 101; *vide* S. coriacea.
Tuberculated Argonaut, or Paper Nautilus, I., 61, 62.
tuberculosa, Argonauta, I., 61, 62; *vide* A. oryzata.
Tubucellaria cereoides, II., 105.
,, hirsuta, I., 49.
tumidus, Palinurus, II., 159; *vide* P. Hügeli.
Tunny, I., 44.
turbinata, Bicellaria, I., 59.
Turtle, Leathery, or Luth, II., 101.
Twelve-plated Shield Star, II., 200.
Two-hooded Furina-Snake, I., 32.
Two-pronged Toad-fish, II., 123.
Tympanocryptis lineata, II., 181.
Typhlops nigrescens, II., 103.
,, *Rüppelli*, II., 103; *vide* T. nigrescens.
typhon, Podacanthus, I., 80.

U.

umbonatum, Amphiblestrum, I., 25; *vide Membranipora umbonata.*
umbonata, Catenicella, I., 90.
umbonata, *Membranipora*, I., 25; *vide* Amphiblestrum umbonatum.
,, (form) Retepora monilifera, I., 94, 97.
uncinata, Farciminaria, II., 158.
undata, Petralia, I., 60.
Urceolipora dentata, II., 105.
,, nana, II., 105.
urnula, Catenicella, II., 146.
utriculus, Catenicella, I., 89.

V.

valida, Phaneroptera, II., 119.
Vanessa, Lepidotrigla, I., 5.
variabilis, *Aluterius*, II., 125; *vide* Monacanthus hippocrepis.
varia, *Lacerta*, I., 41; *vide* Hydrosaurus varius.
variegata, Morelia, I., 13.
varius, Hydrosaurus, I., 41.
,, Yellow-sided Dolphin, I., 21.
ventricosa, Catenicella, I., 24.
venusta, Catenicella, II., 146.
Vermicella annulata, I., 52.
verrucosa, Cellepora, II., 166, 168.
Verrucularia dichotoma, II., 195.
verus, *Carcharias*, I., 74; *vide* Carcharodon Rondeletii.
Victorian Rhodona, I., 51.
vigentissima, Locusta, II., 109.
Vine Day-Moth, I., 8.
violascens, Acrophylla, I., 79.
violascens, *Phasma*, I., 79; *vide* Acrophylla.
Violet-shouldered Phasma, I., 69, 70.
Violet-winged Phasma, I., 79.
Vipera acanthophis, I., 12; *vide* Acanthophis antarctica.
vitrea, *Cellepora*, I., 38; II., 148, 168; *vide* Schismopora.
,, Schismopora, I., 38; II., 148, 168; *vide Cellepora.*
vittata, Chorizopora, I., 36; *vide Lepralia.*
,, *Lepralia*, I., 36; *vide* Chorizopora.
vulgaris, Acanthias, I., 75.
vulgaris, Thynnus, I., 44; *vide* T. thynnus.
vulpes, Alopecias, I., 88.
,, *Squalus*, I., 88; *vide* Alopecias.
vultur, Mucronella, II., 116.

W.

Water Lizard, Gippsland, I., 81.
Wattle Goat-Moth, Large, I., 30.
Whip-Snake, Little, I., 11.
Whitei, Hinulia, II., 191.
Whitei *Scincus*, II., 191; *vide* Hinulia.
White-lipped Snake, I., 11.
White-ringed Snake, Black and, I., 52.
White Shark, I., 74.
White's Hinulia Lizard, II., 191.
White-streaked Earless Lizard, II., 181.
Whiting, Plain, II., 182.
Wilsoni, Adeona, I., 67; *vide Dictyopora.*
,, Beania, II., 195.
,, Catenicella, I., 89.
,, *Dictyopora*, I., 67; *vide* Adeona.
,, Rhabdozoum, II., 178.
Woodsii, *Membranipora*, I., 26; *vide* Thairopora.
,, Thairopora, I., 26; *vide Membranipora.*
Woosteri, Schizoporella, II., 186.
Worm, Earth-, Australian Giant, I., 7.
Worm-Snake, Blackish Australian, II., 103.
Wrasse, Macleay's, II., 164.

Y.

Yabbie or Yabber Crayfish, I., 29.
Yarra Blackfish, I., 27.
Yarraensis, Astacopsis serratus, var., II., 160.
Yarra Spiny Crayfish, II., 160.
Yellow-sided Dolphin, I., 22.
Yellow-Tail, II., 172.
Yellow-winged Locust, Australian, II., 110.

Z.

Zealandiæ, Novæ-, Delphinus, I., 22.
Zeuzera (Eudoxyla) eucalypti, I., 30.
Zygæna malleus, I., 56.
zygæna, *Squalus*, I., 56; *vide* Zygæna malleus.

ADDENDA ET CORRIGENDA.

PLATE 7.—My friend Professor Spencer, in publishing a paper on the anatomy of *Megascolides*, says I have referred it to the wrong Family. As he did not state what was the right Family, I made inquiry and found he had taken Perrier's artificial divisions of Earth-worms (into those having the male genital openings in front of, upon, or behind the clitellum) for Families. Some of the Family *Lumbricidæ* have these openings in one relative position and some in the other; the *one* artificial character not outweighing the many structural characters indicating the Family.

PLATES 15, 29, 160.—For *Astacoides*, read *Astacopsis*.

PLATES 16–17.—References:—For ? Perca trutta (Cuv. and Val.), Hist. Nat. des Poiss., v. 4, p. 54, read vol. 2; add Perca marginata (Cuv. and Val.), Hist. Nat. des Poiss., v. 2., p. 53.

PLATE 42.—For *Lymnodynastes*, read *Limnodynastes*.

PLATE 51.—*Rhodona Officeri* is referred to *R. punctata vittatum* (Günth.), of Queensland, by Mr. Boulenger, but the description in the Ann. and Mag. of Nat. Hist. for July, 1867, differs in several particulars.

PLATE 87.—Explanation of Figures:—Fig. 2, side view of snout, &c., should be: side view of female, &c. Figs. 1*c* and 1*d* should be Figs. 2*c* and 2*d*.

PLATE 109.—Footnote:—For large antennæ, read inner antennæ.

PLATE 112.—In last line of Reference:—For page 696, read page 174.

PLATE 122.—For *Trachypterus tœnia* read *T. tœnia*.

PLATE 139.—(*Mesops pedestris*). Add Reference: *Erichson*, Wiegmann Archiv für Naturgeschicte, 1842, p. 250, t. 5. f. 10.

PLATES 161–2.—The numbers at corners of these plates have been accidentally transposed. That marked 161 should be 162.

PLATE 187.—For Figs. 1–3 read Figs. 1–2.

NOTE FROM MR. MACGILLIVRAY ON CHANGES IN NOMENCLATURE OF POLYZOA ADOPTED IN THE ALPHABETICAL INDEX.

IT has become necessary to alter the generic positions of a considerable number of species, mostly described in the earlier Decades, in consequence of the dismemberment of the old genera *Membranipora*, *Lepralia*, *Eschara*, and one or two others. Definitions of the new genera, with some remarks on the characters which are now considered of chief importance in the systematic arrangement of the Polyzoa, will be found in my Catalogue, printed in the Transactions of the Royal Society of Victoria for 1886.

The alterations indicated are:—*Membranipora pilosa*, to be included in *Electra*, Lamx.; *M. ciliata*, *umbonata*, *cervicornis*, and *Lepralia trifolium* in *Amphiblestrum*, Gray; *M. mamillaris*, *dispar*, and *Woodsii*, in *Thairopora*, McG.; *M. perforata* in *Micropora*, Hincks; *Lepralia monoceros* in *Cribrilina*, Gray; *L. ferox* in *Hiantopora*, McG.; *L. Malusii*, *ciliata*, *diadema*, and *canaliculata*, in *Microporella*, Hincks, the last as a variety of *diadema*; *Eschara mucronata* in *Adeonellopsis*, McG.; *L. circinata*, *Cecilii*, *subimmersa*, *Maplestonei*, *vitrea*, *schizostoma*, *botryoides*, and *pellucida*, in *Schizoporella*, Hincks, *pellucida* as a variety of *hyalina*; *Eschara obliqua* in *Parmularia*, Busk, MSS.; *Eschara quadrata* in *Lepralia*; *L. vittata* and *Brogniartii* in *Chorizopora*, Hincks; *L. marsupium* and *papillifera* in *Porella*, Gray; *Eschara dispar* and *platalea* in *Adeonella*, Busk; *L. larvalis* and *Eschara gracilis* in *Porina*, d'Orb.; *L. diaphana*, *Ellerii*, and *excavata*, in *Mucronella*, Hincks.

Besides these alterations, *Catenicella aurita* and *geminata* are to be referred to *Claviporella*, McG.; *Catenicellopsis delicatula* to *Catenicella*; *Diachoris magellanica* and *spinigera* to *Beania*, as I cannot see any sufficient distinction between these genera. *Carbasea episcopalis* is included in the genus *Euthyris*, Hincks. *Dictyopora* differs from *Adeona* only in the fenestration of the zoarium, a character which, although valid when the genus was proposed, cannot now be considered of sufficient importance for the foundation of a genus; the species must therefore go with *Adeona*. *Cellepora (Lepralia), megasoma*, *costata*, *rota*, *costazei*, *platalea*, *vitrea*, *benemunita*, *glomerata*, *tiara*, have been separated from *Cellepora* to form the genus *Schismopora*, McG.

Chlidonia dædala proves to be, as suggested in my description, in no way different from the European *C. Cordieri*, Aud. sp. *Cellaria fistulosa*, var. *Australis*, must rank as a separate species. *Membranipora lineata* is not that species, but *M. pyrula*, Hincks; so also *M. Rossellii* must be altered to *Amphiblestrum bursarium*, McG. I doubt *M. Lacroixii* being identical with the European species. *Lepralia pertusa* should be *L. Pallasiana*, Moll. *Retepora porcellana*, var. *laxa*, has since been described in the "Challenger" Memoir as *R. producta*, Busk. *Bathypora porcellana* was previously described by Hincks as *Membranipora nitens*, and his specific name must consequently be adopted.

By Authority: ROBT. S. BRAIN, Government Printer, Melbourne.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XI.

BY

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PLATE 101.

SPHARGIS CORIACEA (LINN. SP.).

THE LUTH, OR LEATHERY TURTLE.

[Genus SPHARGIS (MERREM) = DERMATOCHELYS (BLAIN.) = CORIUDO (FLEM.). (Sub-kingd. Vertebrata. Class Reptilia. Order Chelonia. Sub-order Oiacopodes. Fam. Sphargidæ.)

Gen. Char.—Body covered with a thick, coriaceous skin, concealing the bones of the carapace and sternum; several longitudinal ridges on the back, tubercular in young, smooth in old individuals. Paddles large; without nails or claws; head with very strong jaws, the upper with three large, triangular notches in front. Orbits very large; eyelids opening vertically, one in front, and one behind; nostrils very small, approximate, on upper surface of nose. Cosmopolitan.]

DESCRIPTION.—*Form:* Carapace sub-cordiform, acutely pointed behind, broad, and with three inflected edges in front, concavely arched backwards, one over the neck, and one over each fore paddle; greatest width over hind base of paddles two-thirds of the length; longitudinal profile slightly arched, most abruptly near the front; transverse curvature nearly semicircular; longitudinal ridges angular, prominent, with about 28 compressed tubercles, the space between the ridges deeply concave; surface smooth; keels nearly equidistant, one along midline of back, the outermost along lateral edges of carapace. Sternum flat, truncated in front, obtuse-angled behind, without projections on surface. Head nearly as wide behind as long, slightly convex above, moderately compressed and rounded in front; smooth, without scales or plates, when adult; jaws very strong, upper one with three deep, triangular notches defining two acutely angular, sharp lobes in front; lower jaw with an upturned, angular point in front, fitting the median notch between the two lobes of upper jaw. Anterior paddles very long, narrow, falcate; posterior paddles short, broad, the two hinder fingers separately movable. Tail slightly compressed, the point reaching a little beyond the end of carapace; whole skin smooth, except on back of neck, which is tubercular from intersecting wrinkles. *Color:* Purplish-black above, sternum and lower sides of paddles, and sides of neck and cheeks marbled with pinkish-white, and reddish-white on front edge of anterior paddles. *Measurements:* Length of carapace, 4 feet 5 inches; greatest width, 3 feet 2 inches; depth, 1 foot; length of head, 8 inches; width, 7½ inches; depth, 6½ inches; diameter of orbit, 2 inches; from anterior edge of orbit to nostril, 2 inches; length of neck, 6 inches; length of anterior paddle, 2 feet 3 inches; greatest width, 9 inches; length of posterior paddle, 1 foot 1 inch; width, 8 inches; length of sternum, 3 feet 2 inches; width, 2 feet 4 inches; tail, 4 inches.

REFERENCE.— = *Testudo coriacea* (Linn.) Syst. Nat. 1, p. 350 = *S. mercurii* (Rondel.) Pisc. Mar. p. 450 = *T. Lyra*, Donnd. Zool. Beiträge, v. 3, p. 2 = *Sphargis mercurialis* (Merrem) Amphib. p. 19 = *S. tuberculata* (Gravenhorst) = *Dermatochelys porcata* (Wagl.) Syst. Amphib. p. 133, t. 1, figs. 1–25 = *Dermochelys Atlantica* (Leseur).

The *Sphargis* differs from the other marine Chelonians, the *Chelonæ*, in the body not being covered with hard plates, but with a very thick skin, smooth when adult, but covered with tubercular

scales when very young, some flat and polygonal, and some convex and circular. The head and paddles also lose the scales when adult.

Of all living Chelonians the Luth is the largest, some recorded being 9 feet long ; our specimen, from its size and the distinct tuberculation of the dorsal ridges, is only half grown ; but there are no traces of the fine ridges on the sternum said to be found in the very young.

The specimen above described is the only one I have known to have occurred on the shores of the colony. It was captured in 1862 at Portland.

EXPLANATION OF FIGURES.

PLATE 101.—Fig. 1, side view of specimen, one-ninth natural size. Fig. 1*a*, front view. Fig. 1*b*, anterior paddle, to show coloring of under-side. Fig. 1*c*, hind paddle, to show coloring of under-side.

FREDERICK MCCOY.

Dr Wild. del. et lith.

Prof. McCoy direx.

Steam. Litho. Govt. Printing Office.

PLATE 102.

TRACHYDOSAURUS RUGOSUS (GRAY).

THE RUGGED STUMP-TAIL, OR SHINGLE-BACK, LIZARD.

[Genus TRACHYDOSAURUS (GRAY). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Fam. Scincidæ.)

Gen. Char.—Form moderately elongate, thick, fusiform; tail very short, broad, depressed. Head large, trigonal, pointed in front; neck very short, narrow (head shields, ears, palate, tongue, body, and limbs as in *Cyclodus*); teeth blunt, conical; scales of back very large, very thick, bony, with a rugged, ridged surface.]

DESCRIPTION.—*Form:* Short, rounded, moderately depressed, sides rounded; head very thick, trigonal, obtusely pointed in front, widening to ear behind; neck short, moderately constricted; back sloped from midline on each side; tail very short, depressed, slightly rounded above, flat below, little narrower than the body, ending in a small, conical tubercle; anterior and posterior feet nearly equal; toes very short, and only slightly different in length, middle one longest, then 2nd, then 4th (a little shorter than the 1st), then the 5th on anterior foot; three first toes gradually longer, 4th shorter than 3rd, 5th shortest on hind foot. *Scales:* Nasal plates very large, meeting over top of rostral;* inter-nasal hexagonal, very slightly wider than long; two fronto-nasals pentagonal, touching by their inner edges; frontal hexagonal small, slightly longer than wide; five supraoculars; eyelids scaly; a curved row of seven suboculars; two fronto-parietals small, hexagonal, joining by inner edges; inter-parietal hexagonal or heptagonal, little larger than frontal;† two parietals heptagonal, little larger than inter-parietal; behind parietals and occiput are four rows of thick, rugged scales like those of neck; two fronto-orbital plates on each side and two frœnals; ear moderately open, with simple margins; scales of back very large, thick, sub-rhomboidal, with numerous, coarse, irregular ridges converging towards middle of posterior edge, those of middle of back largest, having two rows, those of sides forming oblique bands, those of tail with one median large keel ending in a point at the posterior edge; all the lower surface of chest, abdomen, and tail covered with thin, smooth, wide, hexagonal plates. *Color:* Upper surface dark rich Vandyke-brown, with transverse, irregular, paler yellowish-brown bands, forming usually eight or nine transverse, irregular chevrons from neck to tip of tail, one to two scales wide, above irregularly spotted at tip of scales with rich blackish-brown; the intervening, dark spaces two or three scales wide; on under-side the color is yellowish-white, irregularly blotched and mottled with dark brown. The coloring varies considerably; one specimen in the collection being entirely dark brown above, with only one light transverse band, five scales wide, behind the shoulder, and nearly uniform brown below; another is transversely banded on belly and under-side of tail, much as on the back; while in another the dark marks below are chiefly longitudinal blotches. Tongue flat, wide, notched at the tip, blackish-purple; inside of mouth pinkish-white.

* In some specimens the nasals do not touch, but the rostral and inter-nasal touch.
† In some specimens smaller, and the length and width equal.

Measurements.	Ft.	ins.	lines.
Total length of average specimen	1	2	0
Length of head from snout to anterior edge of ear ...	0	2	6
„ inter-nasal plate	0	0	5
Length of frontal plate	0	0	5
Greatest width „ „	0	0	4
Length of inter-parietal	0	0	5
Greatest width „	0	0	4
Height of rostral plate	0	0	3
Width of „	0	0	4½
Diameter of ear	0	0	3½
Length from tip of snout to anterior edge of shoulder ...	0	3	1
„ of anterior limb to tip of longest claw	0	2	2
„ of longest toe and claw	0	0	3½
„ from anterior edge of shoulder to anterior edge of thigh	0	8	0
„ of hind limb to extremity of longest claw ...	0	2	2½
„ of tail	0	2	6
Girth round middle of body	0	6	9
Number of transverse rows of scales in one inch on middle of back, two.			

Reference.—Gray in King Surv. Austral. App. v. 2, p. 424.

This curious Lizard is exceedingly lethargic in its movements, so that it is commonly known by the popular name of "Sleeping Lizard;" and, from the short, broad, stumpy tail looking somewhat like the head at a distance, the name "Two-headed Lizard" is given to it in some localities, and "Shingle-back Lizard" is the commonest name popularly given to it in the north.

The proportion of the head plates varies slightly. The length of the tail also varies slightly.

The *Trachydosauri* agree in almost every respect with the *Cyclodi*, except in the extraordinary, stump-like shortness of the tail, as if broken off, and its being depressed or flattened from above downwards, instead of tapering gradually to a conical point, and being slightly compressed or flattened from side to side; the teeth are not quite so bluntly rounded; the ear has the front margin simple, and the scales are out of all comparison thicker and more bony, as well as much larger and more ruggedly ridged.

Just at the moment of going to press a curious discovery has been made of the viviparous reproduction of this Lizard, which brings forth in March a single young one of surprising size, about half the length of the parent. A specimen given to me by Mr.

James Hill, from Pine Rises, Kewell, and now in the Museum, shows a young one, over five inches in length, enveloped in a thin membranous bag, but fully formed, scaled, and colored like the parent; the young is doubled abruptly, so that the head and the tail are brought close together at the posterior end. This interesting observation was made at the suggestion of my assistant, Mr. W. Kershaw.

There are only two species known of this genus, and the present rugose Stump-tail Lizard, although long known in Victoria and New South Wales, has not been recognisably figured before, for although Wagler's figure of his *T. Peronii*, on plate 36 of his *Icones Amphibiorum*, is usually quoted for this species, it is comparatively smooth, with smaller, keeled scales, and with a long, conical, tapering tail, and, if correct, must represent a totally different creature, more probably *Egernia*. The specimen figured is from near Melbourne, and the species is not uncommon in northern parts of the colony towards the Murray.

EXPLANATION OF FIGURES.

PLATE 102.—Fig. 1, average individual, half the natural size. Fig. 1*a*, outline of top of head, to show the proportions of the plates, half the natural size. Fig. 1*b*, side view of head and neck. Fig. 1*c*, front view of snout, to show rostral plate, nasal plates, and inter-nasal plate, natural size. Fig. 1*d*, scale from near middle of back, natural size. Fig. 1*e*, under view of foot, to show the small scales on soles, natural size.

FREDERICK McCOY.

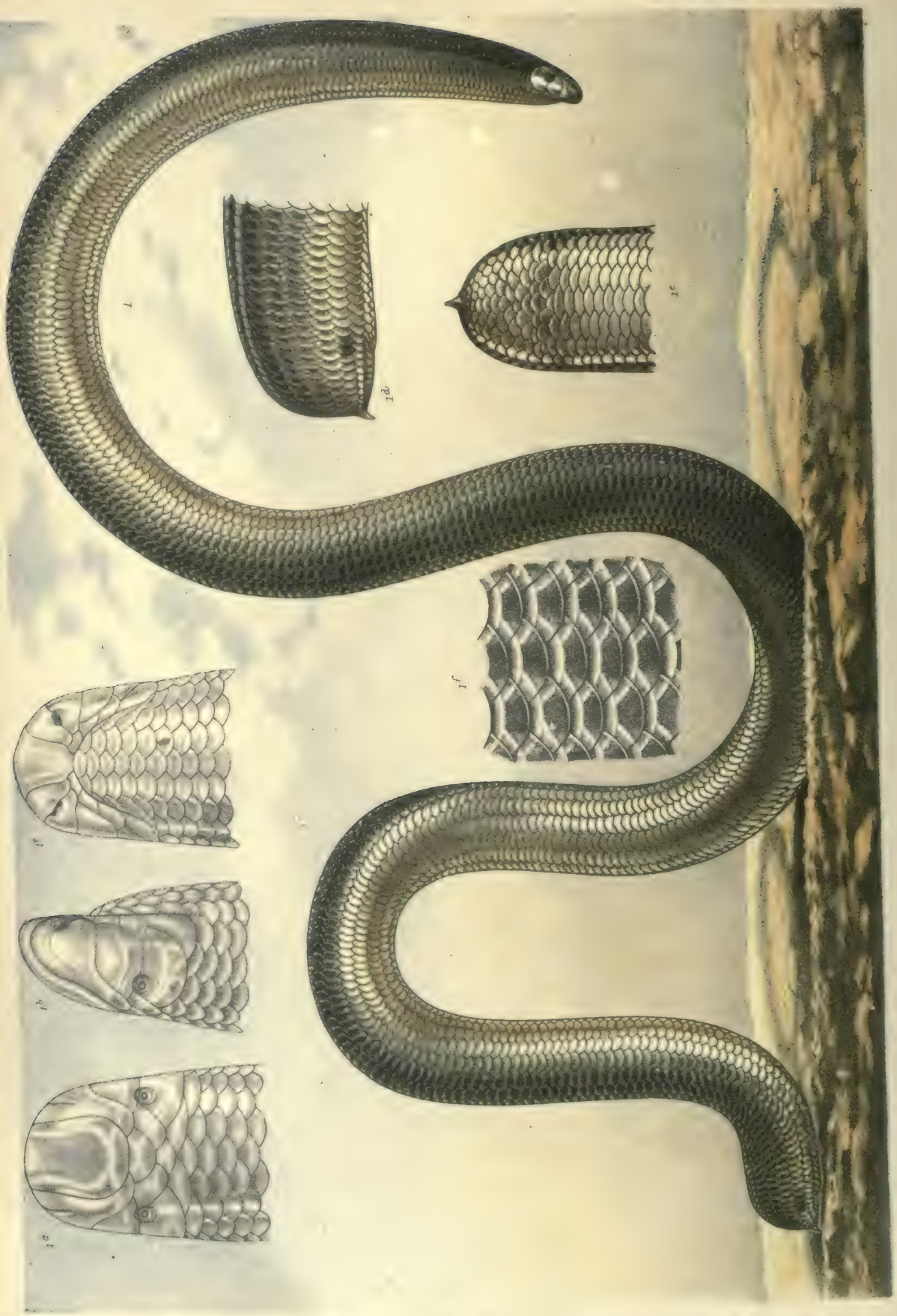

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PLATE 103.

TYPHLOPS NIGRESCENS (GRAY SP.).

THE BLACKISH AUSTRALIAN WORM-SNAKE.

[Genus TYPHLOPS (SCHNEIDER). (Sub-kingd. Vertebrata. Class Reptilia. Order Ophidia. Tribe Scolecophidia. Fam. Typhlopsidæ.)

Gen. Char.—Cylindrical, glossy; head not constricted from body; front margin obtusely rounded from above downwards; rostral plate very large, extending over top of head; nasal plates extending vertically from labials to above eye, divided by a sulcus extending from nostril; preocular plate usually present, oculars larger than preocular, with the eye seen through them when it exists; upper labials usually 4; scales hexagonal, imbricated, alike on back, sides, and abdomen; preanal scales numerous, and like the ventrals. Teeth simple, 3 or 4 in upper jaw only. Tongue long, flat, forked at tip. Mouth small, lunate, inferior.]

DESCRIPTION.—Body smooth, glossy, cylindrical, of nearly equal diameter throughout, and covered with 22 rows of hexagonal scales, the posterior edge of each nearly semicircular and much imbricated. Tail very short, of the 12 last scales, obtusely rounded and bent downwards at the end, so that the terminal thorn arises nearly on a level with the ventral surface and inclines downwards. Head narrower than the body, depressed, obtusely rounded in front both vertically and transversely; rostral plate large, margin broadly rounded on top of head behind, slightly concave towards front, and narrowed to edge of lip below; nasal plate rising from 1st labial, widening to edge of snout, and narrowing upwards to inter-nasal plate behind rostral; nostril below lateral margin, with a sulcus dividing the plate into two below, where it touches the middle of the 1st labial; the nasal sulcus extends vertically upwards beyond the nostril rather further than below; 2nd labial a little larger than first, touching nasal and preocular plate; 3rd labial larger, and extending up between bases of preocular and ocular plates; 4th labial largest, rounded, and with a small notch on lower hind margin. The three anterior, median, vertex plates, taken together, about two-thirds the length of the dorsal part of rostral plate; the 1st, or inter-nasal plate, largest, sub-hexagonal, the posterior margin nearly semicircular; 2nd, or frontal, smallest, hexagonal; 3rd, or occipital, in size and shape nearly like the 1st; they and the labial ones are larger, but nearly like the scales of the body. Preocular narrower than the ocular, the eye distinctly seen through the upper part of their junction, below the re-entering angle for the fronto-nasal plate. *Color:* Twelve rows of scales on back and sides, each greyish-brown on posterior two-thirds, whitish on anterior third, generally paler and browner towards the head; lateral portions of anterior head shields and all the scales of lower side of body yellowish in some specimens, greyish-white in others; the coloring of the scales of back is seen through the transparent overlapping ones in front. Length of average specimen, 21 inches 6 lines; of tail, 4 lines; diameter at base of tail, 5½ lines, in both directions; diameter in both directions about middle of body, 7 lines; length of head from front edge of snout to hind edge of third median (occipital) plate, 4½ lines; width of head, 4 lines.

REFERENCE.—*Anilios* id. Gray, C. Liz., B.M. p. 135 = *Typhlops* id. Jan. Icon., Gen. des Ophid., p. 13; Liv. 9, t. 1, f. 1; ? = *T. Rüppelli*, Jan. Op. Cit., t. 1, f. 2.

The "Slow-Worms" or "Blind-Worms" of English writers, and their numerous allies in various foreign countries, are very difficult to classify, from their having several characters of Lizards combined

with most of those of Snakes. The absence of external limbs, although striking the popular eye, is not a distinctive character, for in some undoubted Lizards these are wanting.

The "Worm-Snakes," as the curious group of Reptiles called *Scolecophidiæ* by Dumeril and Bibron may be termed, are so singularly like the "Slow-Worms" or "Blind-Worms" of English writers in size, shape, general appearance, and habits, that it is not easy for the popular observer to discriminate them. The absence of limbs is a character of Snakes common to both ; but the true "Slow-Worms" have the two halves of the lower jaw united by bony union at the chin, as in the Lizards, and also agree with them in having movable eyelids, and more or less distinct external drum to the ear, as well as some rudiments under the skin of the limbs. The present Worm-Snakes, on the other hand, have the halves of the lower jaw free and separable in front, as in the *Ophidiæ*, or Snakes, and, like them, also, are destitute of eyelids and external ear-drums, so that the balance of the structural evidence would go to classify the Worm-Snakes with the Snakes, and the Slow-Worms with the Lizards. Nevertheless, Dr. Gray, as well as Fitzinger and Schlegel, class the creatures I propose to call "Worm-Snakes" with the Lizards or Sauria, as well as the "Slow-Worms," or *Anguis*, and other allied small snake-like *Lacertilia*, and at one time Dr. Gray proposed to form an Order *Saurophidia*, to include *Typhlops*, *Anguis*, and a number of other snake-shaped reptiles which are now, however, by general consent, kept in different orders.

The "Worm-Snakes," by their small size, cylindrical body—scarcely tapering at the very short tail, both ends being much alike—glossy smooth surface, and habit of burrowing in the loose soil, differ from all other Serpents and Snakes, and sufficiently resemble Earth-Worms, to excuse the use of a popular name, recalling the similar ones of Blind-Worm and Slow-Worm applied to the species of *Anguis*, although they are neither blind nor slow. The muzzle is broader, in proportion to the back of the head, than in ordinary Snakes, and the bones of the anterior part of the head and face are solidly joined together, so that the mouth is incapable of the dilatation of Snakes in general, although, like them, and

unlike Lizards, the halves of the lower jaw are not joined together in front, and the mouth, by its inferior position, like that of a Shark, below and behind the tip of the snout, differs equally from Lizards and Snakes. The small number of teeth, and their being either in the upper or under jaw, but not in both, is a special peculiarity of the group of Worm-Snakes. Another peculiarity of this group is the fact of the eyes being covered by one or two large plates of the side of the head, and through the translucent substance of these plates the eyes underneath may be dimly seen when they exist. Some seem to be blind, as, indeed, their subterranean habits and finding the Earth-Worms and larvæ of insects for food, in the dark earth, without the sense of sight, might lead one to expect.

By a sort of practical joke, not uncommon in nature, the posterior, or tail end, in this species is made to look almost exactly like a head, by a pair of round black spots, so nearly of the size, shape, and color of the real eyes of the other end, and so similarly placed over the ends of the transverse, lunate, mouth-like slit on the ventral surface of that end, as to be readily taken for the eyes by an unpractised observer, taking away even the crucial test by which the boys in Leech's caricature terminated their dispute as to which was the head of the Skye terrier, by one at last "seeing the eyes" at the most unlikely end. The presence of these two eye-like posterior spots is almost the only character set down by Prof. Jan as distinguishing his *T. Rüppelli* from Gray's *T. nigrescens;* but as the only specimens in which I could not see these spots had the skin so opaque, from being near the time of casting it (when the real eyes are also obscured), I have no doubt of both belonging to one species, as Prof. Peters has already suggested in the Monatsbericht der Königl. Preuss. Akad. der Wissenschaften zu Berlin, for June 1865, p. 262. There is, too, a singularly deceptive appearance produced by the transparent scales of the back, showing the semicircular dark margin, not only on the exposed, posterior edge of each, but continued visibly through the transparent, adjacent, overlapping scales, so that the apparent scales marked by the coloring do not coincide with the real scales marked by the free edges, as seen with a lens and as represented in our figure (1*f*).

Although Dr. Gray was the first to describe this species (under

the generic name *Anilios*), there can be no doubt that he is unaccountably in error in stating that there are no upper labial shields in the family *Typhlopsidæ*, as the four are clearly present in all our specimens, as described by Prof. Jan.

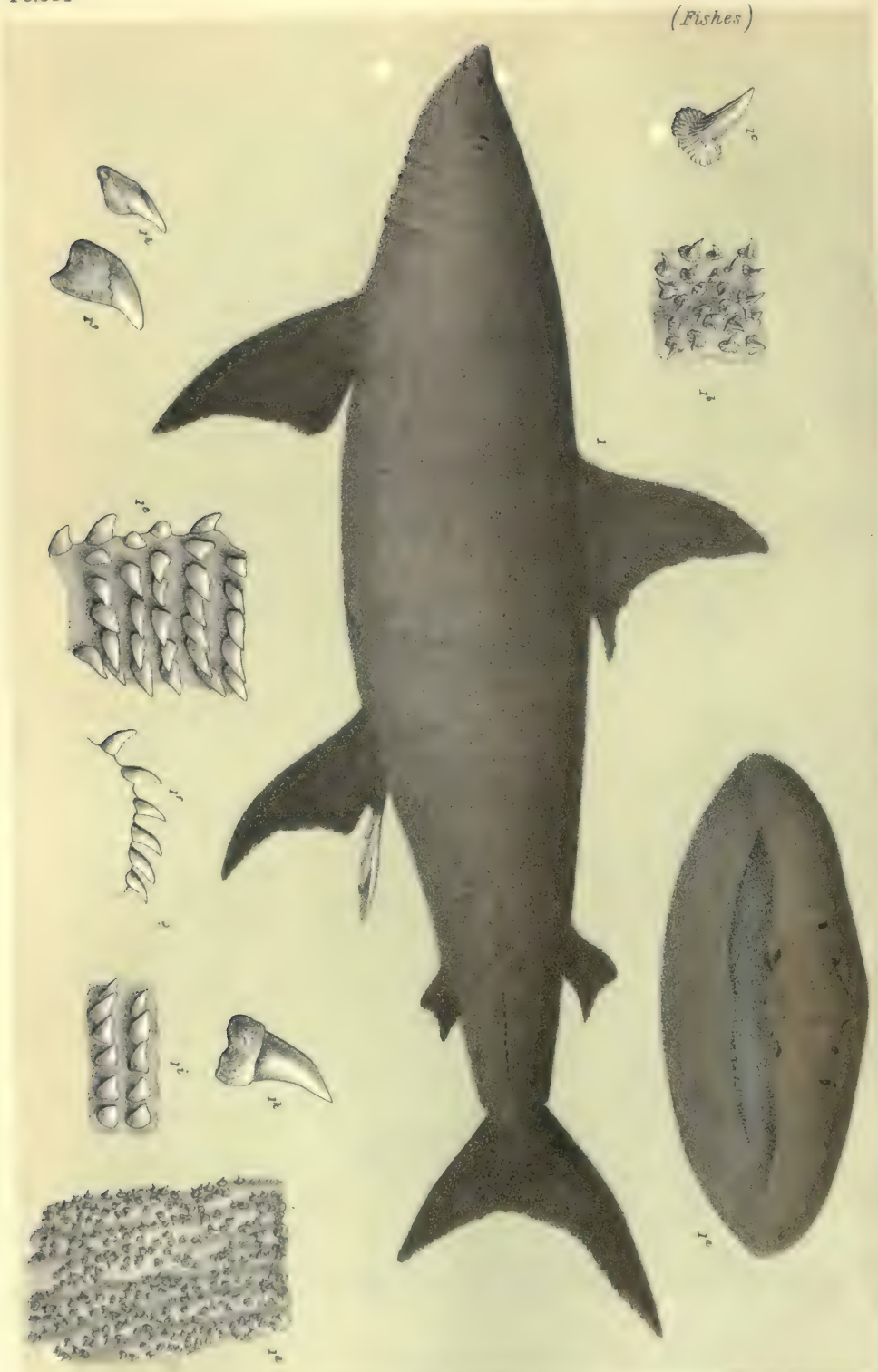
The "Blackish Worm-Snake" is not uncommon in the northern warmer parts of the colony in localities having a loose, friable, or sandy soil, in which it burrows to a considerable depth with extraordinary ease and quickness. The specimen figured is from Murchison, presented by Mr. H. J. E. Brisbane; but two still larger ones sent to me alive by Mr. J. P. Watt, from Taripta, I have kept alive for some time in large glass jars half filled with sandy soil at bottom, into which, when brought to the surface, they burrow so rapidly that the whole body is out of sight in an instant —the head being first raised, then arched and forced down with such strength that the glossy smooth body is quickly buried to the greatest depth. These specimens were dug out of an ant-hill in which they dwelt in the midst of the abundant insect food suited to them. It is almost impossible to hold them, they struggle with such strength, and are so smooth and slippery. The tongue is very long, narrow, flat, largely forked at the end, and of a dull red color, being darted out frequently to a length of an inch or so, as in ordinary Snakes. These Worm-Snakes are perfectly harmless, although, like the Slow-Worms and their allies in other countries, they are popularly supposed to be very poisonous. They do not attempt to bite when handled; and as the mouth is so very small and incapable of dilatation, and the few very small teeth are solid, and there are no poison glands, there could be no harm to man if they did.

It has not been figured of the colors of life before.

EXPLANATION OF FIGURES.

PLATE 103.—Fig. 1, large specimen, natural size, partly embedded in sand at middle, and showing the position assumed by the anterior end and head when about to plunge into the sand to bury itself. Fig. 1*a*, upper view of head, three times the natural size, to show form of cephalic plates, with relative sizes of rostral, inter-nasal, frontal, and occipital plates in midline, and the extension of the nasal sulcus on the nasal plates, also showing the covering over of the eye by the preocular and ocular plates, and slightly by the outer angle of the fronto-nasal plate. Fig. 1*b*, side view of head, magnified three diameters, showing upper labial, nasal, preocular, and ocular plates, and eye and nostril and nasal slit in due relation. Fig. 1*c*, under view of head, showing narrowed end of rostral plate touching the mouth, and the relation of the labial plates to the others. Fig. 1*d*, side view of tail, twice natural size, showing posterior thorn and eye-like spot. Fig. 1*e*, ditto, from under-side, to show anal plates. Fig. 1*f*, scales of back, four times the natural size, to show markings of color through the overlapping scales.

FREDERICK MCCOY.



A. Bartholomew del. et lith.

Prof. M'Coy direx.

Steam. litho. Govt. Printing Office.

PLATE 104.

CETORHINUS MAXIMUS (LINN. SP.).

THE BASKING SHARK.

[Genus CETORHINUS (BLAINV.) = SELACHE (GOY.). (Sub-kingd. Vertebrata. Class Pisces. Order Placoida. Sub-order Selachoidea. Fam. Lamniadæ.)

Gen. Char.—Snout short, narrow, blunt; spiracles small, above angle of mouth. Gill-slits five, very large, nearly meeting under throat. Teeth very numerous, very small, conical, moderately arched backwards, without denticulation or lateral cusps; scales of slender, erect, slightly curved points, rough to the touch in all directions. First dorsal opposite space between pectoral and anal, without spine; second dorsal small, slightly in advance of the equally small anal; caudal lunate, with pit at base above and below; tail keeled on sides. No nictitating eye-lid.]

DESCRIPTION.—Fusiform, head very small, abruptly narrowed to a short snout with a slightly concave profile rising from a little behind the eye; several mucous pores at the sides; eyes near tip of snout; nostrils near edge of upper lip; spiracles small, above and a little behind the angle of the jaw. Gill-slits enormously large, reaching from high above middle of sides to nearly meeting under throat. Teeth very small, simple, conical, slightly arched backwards, six rows of about 120 on each side of lower jaw, and five rows of about 109 in each side of upper jaw; those of under jaw a little wider than the upper ones. First dorsal large, over the space between the pectoral and ventral fins, upper angle approaching a right angle, hinder angle narrow, prolonged, pointed; 2nd dorsal small, upper angle obtusely rounded, hind angle acutely prolonged; anal fin resembling the 2nd dorsal, nearly under, and slightly behind it; pectorals broad, pointed, a little behind the last gill-opening; ventrals moderate; claspers of male small; caudal fin with a deep, transverse pit at base above and below, lunate, upper lobe larger than lower; a strong keel on each side from middle of base of tail to a little behind base of anal fin. Skin covered with very numerous, irregular, flexuous, rounded wrinkles, their own diameter apart, and about 10 in one inch, nearly vertical on most of the body, but longitudinal on head, and obliquely transverse on bands between gill-openings, closely set with nearly erect, slender, conical, slightly-curved thorns, about four in 1 line (or eleven in $\frac{1}{4}$ inch), about $\frac{1}{5}$ line long, and rendering the surface rough to the touch in all directions, but least so towards the tail, in which direction they chiefly incline; the individual wrinkles are not more than 1 or 2 inches long. *Color:* Nearly uniform blackish-brown or tar-color, lighter below; iris brown.

MEASUREMENTS.	Feet.	inches.
Length from tip of snout to tip of upper lobe of tail ...	30	6
„ „ „ origin of first dorsal	9	8
„ across from one angle of mouth to the other ...	2	9
„ of upper jaw	2	2
„ of lower jaw	1	11
Nostrils on edge of upper lip, distance apart	1	0
Girth at middle of body	20	0
Length from tip of snout to anterior edge of orbit	0	9½
„ „ „ „ „ of pectoral fin ...	6	0
„ of anterior edge of pectoral	5	9

Measurements—*continued.*	Feet.	Inches.
Width of pectoral	2	3
Length from anterior base of pectoral to anterior base of ventral	9	3
„ of anterior edge of ventral	4	9
„ of terminal edge of ventral	3	0
„ of base of ventral	1	8
„ of claspers of male	3	9
„ from posterior edge of base of ventral to anterior edge of anal	4	8
„ of anterior edge of anal	0	9
„ of terminal edge of anal	1	2
„ of posterior edge of anal	0	7
Diameter of orbit	0	3
Distance of eyes apart	1	3
Length from posterior edge of orbit to spiracle	1	6
„ „ angle of mouth to spiracle	1	2
Depth of snout at vertical of eye, upper jaw	0	9
„ „ „ „ lower jaw	0	8
Length from tip of lower jaw to anterior edge of pectoral ...	5	6
„ of longitudinal space occupied by the five gill-slits ...	2	0
„ of anterior edge of first dorsal	5	0
„ of hinder edge of first dorsal	1	5
„ of top edge of first dorsal	5	0
„ of base of first dorsal	3	4
„ from posterior edge of base of first dorsal to anterior edge of second dorsal	7	3
„ of anterior edge of second dorsal	1	4
„ of upper edge of second dorsal	1	5
„ of posterior edge of second dorsal	1	3
„ of base of second dorsal	1	0
„ from posterior edge of second dorsal to tip of upper lobe of caudal	9	6
„ from tip to tip of caudal fin	7	0
„ from tip of upper caudal lobe to pit at base ...	5	7
„ from tip of lower caudal lobe to pit at base ...	4	0
„ from middle of caudal fin to posterior end of keel ...	2	3
„ of teeth towards middle of mouth, where largest ...	0	$0\frac{1}{4}$

Number of teeth in a space of one inch, about five.

Reference.— = *Squalus maximus*, Gunner, Beschreibung des Brugden in Schriften der Drontheimschen Gesellsch. Theil. 3, p. 28 (1765) = Id. Linn. Syst. Nat., ed. 12, vol. I., p. 400 (1798) = *Cetorhinus Gunneri*, + *C. Homianus*, + *C. Shavianus*, Blainville, Bull. Soc. Phil., 121 (1816) = *Selache maxima*, Goyeau, Hamburg Magazin, vol. 24, p. 531, Cuv. Reg. An., vol. 2, p. 391 (1829).

As De Blainville's generic name, *Cetorhinus*, has a clear priority over Goyeau and Cuvier's *Selache*, and as the approximation to the characters of Whales is curiously greater in this than in any other fish, I have followed Dr. Gray in adopting it for the present Shark. The extraordinary circumstance of the individual I have here figured and described having come so far south gives special interest to this specimen, which was caught in November, 1883, at Portland, on the western coast of Victoria. It, as often happens in the northern hemisphere, to which, until this occurrence, it was

supposed to be confined, was found entangled in the nets of the fishermen, and having wrapped the nets round itself by rolling and struggling, it became exhausted and was killed. In other countries where fishermen have recorded their meetings with this monster, the accounts agree in showing it to be a quiet, sluggish creature, quite destitute of the ferocity of other Sharks, swimming along, showing its back and dorsal fin above water, and with its mouth open to catch its small, floating food, like a Whale, and when basking quietly on the surface being so indifferent to the approach of a boat that the man may feel it without any alarm or movement of anger on the part of the Shark, unless harpooned, when it darts to the bottom with great force and velocity, and unlike a Whale, which must come up to breathe, it stays below, making it a dangerous captive for any ordinary fishing vessel.

The excessively small size of the teeth, far smaller in proportion than in any other Shark, and the very small size of the gullet, shows a curious approach to the Whales, and departure from the usual structure of Sharks. And I find another extremely curious and interesting point, not before noticed, viz., that its food, as with many Whales, is often composed of myriads of the minute, floating, oceanic Pteropodous Mollusca. Of the scores of Basking Sharks that have been opened in the Northern Hemisphere not one contained any remains of fishes or large objects, and the food was, until now, unknown. Linnæus mentions Medusæ, Pennant suggests sea-weeds, and Mr Low says he found a pulpy red mass, which he likened to bruised crabs, or the roe of Echini. Neither crabs nor Echini could be obtained by a creature like this, too large to approach the shallow shores, and in all probability what Mr. Low saw was what I have here noted, the red pulpy mass filling the intestines of our example being altogether composed of body and shells of a species of the genus *Cuvieria* or *Triptera*, rather less than a line long, fusiform, pointed, and slightly arched at posterior end, mouth contracted, oblique (which might be named *Cuvieria minor*), the mass being tinted of a "boiled-shrimp" red from the remains of the soft parts, colored like the much larger *Triptera rosea* of Quoy and Gaimard. I owe the knowledge of this food to my vigilant friend,

Mr. M. Dusting, of Portland, who sent me a sample he had taken from the intestines when giving me notice of the capture of this Shark, the species of which he correctly recognised.

The tongue is very small, with little movable part, the greater portion of the mouth being occupied by the gill-openings.

This is the largest species of the whole class of Fishes (one noted by Yarrell, at Brighton, being 36 feet long), and as, like many Whales, and unlike other Sharks, it migrates in shoals of one to two hundred individuals, each of which is worth from £30 to £50, it is of great value where any peculiarity in the ocean (as at the "Sunfish Bank," one hundred miles west of Clew Bay, on the west coast of Ireland) induces it to come regularly within reach of the fishermen. The liver only is taken, the rest of the body being left at about a day's sail out of sight of land where they are found. The liver weighs about two tons, and yields 10 or 12 barrels (eight to the ton) of the finest oil, like spermaceti. The specimen figured, after its liver was taken out, was brought by railway to Melbourne, and attracted crowds in the streets as it came up Swanston-street on two of the largest lorries fastened together, drawn by a long train of horses to a stable-yard, where it was exhibited during the race week; the hot weather rendering it useless as a specimen for the Museum afterwards. The teeth and portion of skin were preserved, and all the measurements and the drawings completed before it defied approach.

This is the first good figure of this famous Shark which has been published. The figures of Yarrell and Couch represent the anal fin as too small and much too far back; Home's figure of a male, exactly the same size as ours, in the Philosophical Transactions for 1809,* omits the anal fin altogether, but is otherwise the best of those hitherto published; the skin seems too smooth, the lower jaw too long, and the concavity of the profile is not represented. The concavity of the profile (as well as the size of the mucous pores

* "An anatomical account of the *Squalus maximus* (of Linnæus), which, in the structure of its stomach, forms an interesting link in the gradations of animals between the Whale Tribe and cartilaginous Fishes," by Everard Home, Esq., F.R.S., read May, 1809.

on the snout) is exaggerated in Couch's figure. De Kay's figure and one of Shaw's ridiculously exaggerate the wrinkling of the skin, and all show one or another variation of badness, mutually correcting each other, but rendering the figure here given very desirable.

EXPLANATION OF FIGURES.

PLATE 104.—Fig. 1, side view of male, one forty-second part of the natural size (an apparent doubling of the spiracle is an accident in the lithography). Fig. 1*a*, front view of mouth open, to show the rows of very small teeth, and front view of head, to show the position of nostrils on edge of upper lip. Fig. 1*b*, portion of skin, magnified two diameters. Fig. 1*c*, one of the thorns, magnified nine diameters. Fig. 1*d*, portion of skin, natural size, to show the wrinkles or ridges and the thorny spines inclined in every direction. Fig. 1*e*, six rows of teeth from front portion of left side of lower jaw, natural size. Fig. 1*f*, same, viewed in profile, to show curvature of surface to which the teeth are attached. Figs. 1*g* and 1*h*, two of same teeth, magnified two diameters. Fig. 1*i*, two of the rows of teeth from portion of upper jaw, natural size. Fig. 1*k*, one of same, magnified two diameters.

FREDERICK MCCOY.

W.H. Mac Gillivray del.
J. Thomas lith.

Prod. McCay direxit

Steam lithic Govt. Printing Office

PLATE 105, FIG. 1.

CELLARIA RIGIDA (McG.).

[Genus CELLARIA (LAMX.) = SALICORNARIA (CUVIER). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Salicornariidæ.)
Gen. Char.—Zoarium simple or branched, cylindrical, with the zoœcia arranged around an imaginary axis.]

DESCRIPTION.—Polyzoary regularly dichotomously branched; branches cylindrical, slightly arcuate, usually enlarging upwards; zoœcia mostly rhomboidal, pointed above and below; mouth in the upper half, lofty, slightly contracted towards the straight lower lip; operculum with, on each side, a cervicorn mark, and posteriorly a projecting, somewhat wedge-shaped process for the attachment of the occlusor muscles. Avicularium very large, replacing a cell; mandible of great size, nearly semicircular. Ovarian cells rounded above, narrowed below; the pore semilunar at the extreme upper end of the cell, with the lower edge usually projecting and smooth or obscurely crenulate.

REFERENCES.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1884; *Salicornaria simplex*, Busk, Challenger Polyzoa, p. 88, pl. xxxiii., f. 8.

Port Phillip Heads, usually on Dictyopora.

This fine species forms tufts 1 to 3 inches high. The articulations are frequently rigid from calcification. The internodes are thick and usually slightly curved. The zoœcia are nearly regularly rhomboidal; the ovarian ones broad and rounded above and narrowed below. The mouth is situated in the upper half, the lower lip corresponding to about the middle of the zoœcium; deep in the interior are two sharp, stout, calcareous denticles from each of the upper and lower margins, directed vertically upwards and downwards. The operculum is very peculiar; it has a large cervicorn mark on each side, and the occlusor muscles are attached to projecting, wedge-shaped processes. The avicularium is of great size, replacing a cell; the upper margin projects much forwards, and the mandible is very large, nearly semicircular, and directed upwards. The ovarian pores are mostly semilunar, situated close to the upper margin of the zoœcium, and about the same width as the mouth; the lower edge projects upwards as a sort of lip, which is either smooth or very faintly crenulate.

In Decade V., pl. 49, I described a form of Cellaria as *C. fistulosa*, var. *australis*. Having subsequently, through the

kindness of Mr. Hincks and Mr. Waters, received European specimens of *C. fistulosa*, I was satisfied that they ought to rank as distinct species, and therefore proposed (Trans. Roy. Soc. Vict. 1884) to name it *C. australis*. In the Challenger Polyzoa Mr. Busk has described the same species as *Salicornaria clavata*, probably not having noticed that I had already changed the varietal into a specific name.

EXPLANATION OF FIGURES.

PLATE 105.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of same, magnified, showing outline of zoœcia and an avicularium. Fig. 1*b*, group of zoœcia and an avicularium. Fig. 1*c*, single zoœcium, showing the intra-oral denticles. Fig. 1*d*, three zoœcia, two showing the ovarian pores.

PLATE 105, FIG. 2.

TUBUCELLARIA CEREOIDES (ELLIS AND SOLANDER).

[Genus TUBUCELLARIA (D'ORBIGNY). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Tubucellariidæ.)

Gen. Char.—Zoarium consisting of cylindrical internodes connected by corneous tubes; branches arising dichotomously or irregularly from the sides of the segment to which they are attached. Zoœcia prominent above, narrowed below, when young distinct, but when older indistinct; peristome produced into a short tube; frequently a small, circular, median pore in front; surface punctate.]

DESCRIPTION.—Zoarium consisting of cylindrical branches, each branch articulated by a corneous tube to the side of that from which it springs. Zoœcia indistinct; mouth circular; whole surface punctate.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1884.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

Of this I have only seen two specimens, sent to me by Mr. J. B. Wilson; one three-quarters of an inch in length, the other smaller. The zoarium consists of cylinders branched exactly as in *Cellaria australis*, the branches arising from the sides of those from which they spring by flexible corneous tubes. The zoœcia are, on the surface, quite confluent, and mostly only distinguishable by their mouths. The whole surface is beautifully punctate, the punctations being caused by the reticulation of chains of small depressions or pores. There is usually a minute circular opening about the middle of each zoœcium.

EXPLANATION OF FIGURES.

PLATE 105.—Fig. 2, specimen, natural size. Fig. 2*a*, portion of same, magnified.

PLATE 105, FIGS. 3 AND 4.

URCEOLIPORA DENTATA (McG.).

[Genus URCEOLIPORA (McG.). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Bifaxariidæ.)

Gen. Char.—Zoarium continuous, irregularly branched. Zoœcia alternate, in two series, facing opposite ways, and each springing from the upper and posterior part of that immediately preceding; oral opening facing directly or obliquely upwards, entirely occupied by the operculum; a slight ridge on each side of the zoœcium, probably indicating a shallow anterior compartment.]

DESCRIPTION.—Zoœcia arranged in a double series facing opposite ways, alternate, elongated, sub-cylindrical, but narrowed below and projecting in front; mouth terminal, oblique, lower margin straight, upper semicircular, with usually five short, stiff spines. Oœcia large, smooth, imbedded in the front of the zoœcium above.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, dredged by Mr. Wilson and myself.

Forms small tufts about an inch high. The zoœcia bear a marked resemblance to those of *Calwellia bicornis*, although there is not the same peculiar mode of connection. On the lower lip there is on each side a minute mark or pit, and immediately below a small median pore.

EXPLANATION OF FIGURES.

PLATE 105.—Fig. 3, specimen, natural size. Fig. 3*a*, portion of the same, magnified. Fig. 3*b*, two zoœcia, more highly magnified. Fig. 4, small portion of another specimen, mounted in balsam by Mr. Wilson, seen by transmitted light, showing two oœcia.

PLATE 105, FIGS. 5–7.

URCEOLIPORA NANA (McG.).

DESCRIPTION.—Zoœcia elongated, urceolate, mouth terminal, opening nearly vertically upwards, lower lip hollowed, with a projecting, sub-triangular process on each side, sometimes bearing a small avicularium. Oœcia with the surface minutely cribriform or marked with radiating beaded lines.

REFERENCES.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1880; *? Callymmophora lucida,* Busk, Challenger Polyzoa, p. 84, pl. xxxii., fig. 8.

Port Phillip Heads.

This species forms small, dichotomously branched, rigid tufts, about half an inch high, growing on Retepora and other Polyzoa.

It differs from the last in its stouter habit, the mouth opening more directly upwards, the single sub-triangular process on each side, and the radiately marked or cribriform oœcia.

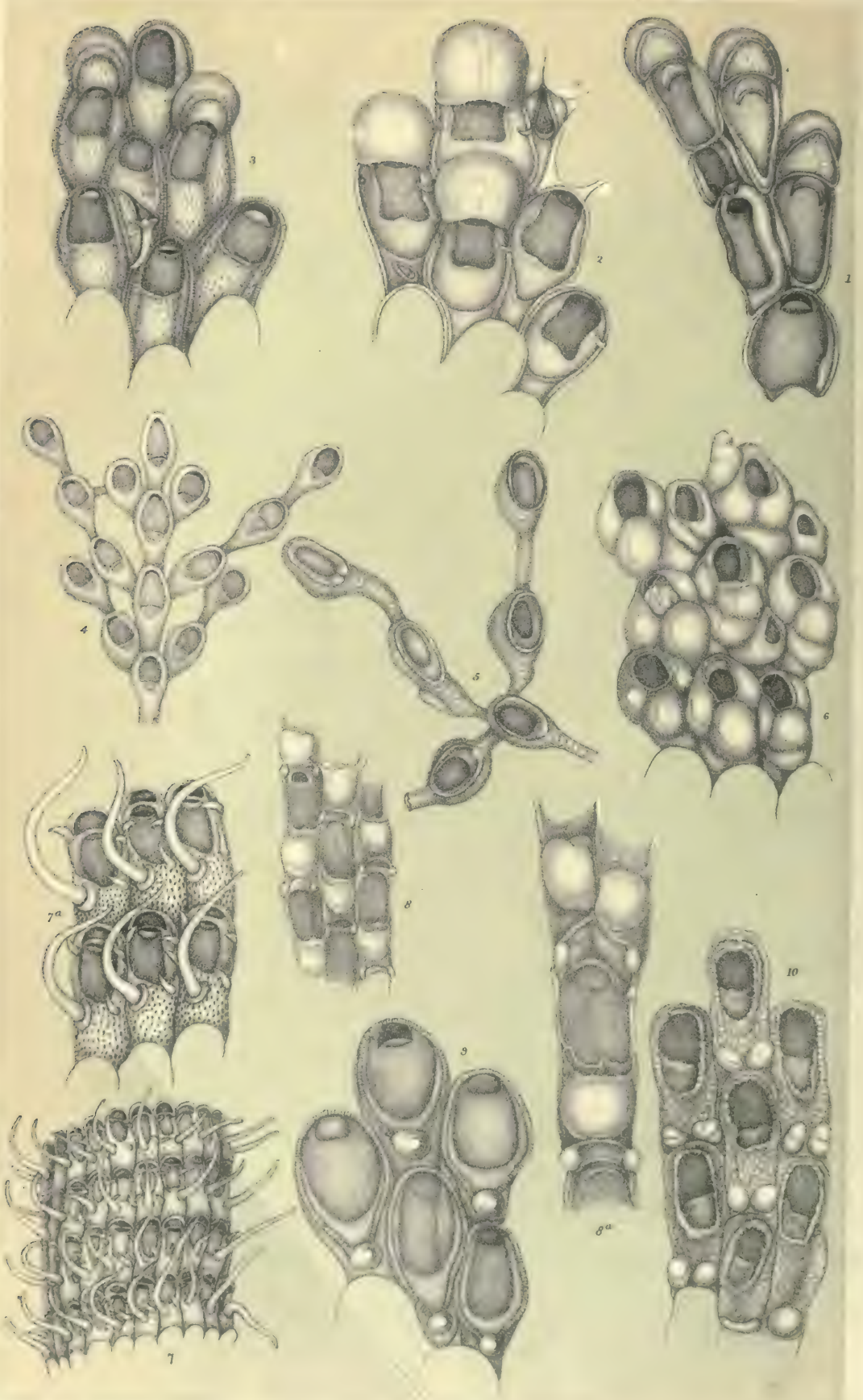
EXPLANATION OF FIGURES.

PLATE 105.—Fig. 5, specimen, natural size. Fig. 5*a*, portion of same, magnified. Fig. 5*b*, another portion, more highly magnified. Fig. 6, two cells and radiately marked oœcium (from dried specimen), viewed in front. Fig. 7, portion of a specimen mounted in balsam, showing cribriform oœcia and portions of loose epitheca.

These two species form a well-marked genus, for the second of which I proposed in 1880 the name *Urceolipora*. Mr. Busk, in the Challenger Polyzoa, having no doubt overlooked my previous description and figure, describes a form which is probably identical with *U. nana* as *Callymmophora lucida*, taking the name from the loose veil-like disposition of the epitheca. I have not had an opportunity of examining living or spirit-preserved specimens, but I believe that this will probably be found a characteristic feature. It is shown partly in figures 4 and 7, as well as in my original figure, which are taken from specimens beautifully mounted in balsam by Mr. J. B. Wilson; and shreds of the membrane can also be detected in some of my dried specimens.

I am indebted to Mr. MacGillivray for the descriptions and specimens of the Polyzoa on this plate.

FREDERICK MCCOY.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10
7

PLATE 106, FIG. 1.

AMPHIBLESTRUM PUNCTIGERUM (HINCKS).

[Genus AMPHIBLESTRUM (GRAY). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting. Zoœcia with the aperture occupying the whole front or with part of the zoœcium produced below; aperture partly filled in by an additional membranous or usually calcareous lamina.]

DESCRIPTION.—Zoœcia variously shaped, separated by raised smooth margins; aperture occupying the whole front, except a very narrow space below and at the sides which is filled in by a thin, calcareous, smooth or faintly granular membrane. Oœcia large, faintly granular, with a mitriform or quadrate portion in front separated by a narrow raised line.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, on algæ.

This seems to be a rare species, as I have only seen two or three not very good specimens. The zoœcia are of a large size and very variable in shape. The raised margins are narrow and smooth. There is a very narrow calcareous membrane, sometimes scarcely distinguishable, on the lower part and extending up the sides. The mitriform or quadrate space on the front of the oœcium seems to be caused by a deficiency of the outer layer at this part.

EXPLANATION OF FIGURES.

PLATE 106.—Fig. 1, small portion of a specimen, showing the various shapes of the zoœcia, the irregularity in extent of the calcareous thickening of the membrane, and three oœcia.

I have followed Busk (in the Challenger Polyzoa) in considering those Membraniporæ with the membranous aperture partly filled by a thicker chitinous or calcareous lamina as a distinct genus, and have adopted his name derived from Gray. Gray, however, originally proposed the name for *M. membranacea*, which in my opinion ought to be taken as the type of the true Membraniporæ, the name having been first applied to it by Blainville. Gray, moreover, makes no reference to an additional thickening of the membranous front, which in fact does not exist in *M. membranacea*. Those species previously described in this work as Membraniporæ and which are referable to the present genus are *M. umbonata*, *cervicornis*, and *Rosselii*.

PLATE 106, FIG. 2.

AMPHIBLESTRUM FLEMINGII (BUSK).

DESCRIPTION.—Zoœcia large, variously shaped, surface granular; inner aperture large, obscurely trifoliate; a spine on each side. A sessile avicularium at the base of a zoœcium, with the mandible directed upwards or laterally. Oœcia large, prominent.

REFERENCES.—Busk, Cat. Mar. Pol. Brit. Mus, pt. ii., p. 58, pl. lxxxiv., figs. 3–5; Hincks, Brit. Mar. Polyzoa, p. 162, pl. xxi., figs. 1–3.

Port Phillip Heads, dredged by Mr. J. B. Wilson and myself.

I have only seen two small fragments of this species, but I have no doubt that it is identical with *M. Flemingii*, although differing in size and appearance of the oœcia from those of the only European specimen I have. In the Victorian specimens the zoœcium is generally produced below the margin, and it is in this part that the avicularium is situated. The mandible is usually pointed directly upwards, but it is occasionally transverse to the zoœcium. In the European form there are generally two avicularia at the base of a zoœcium. In my specimens most of the zoœcia are destitute of spines, and when present there is only one on each side. The oœcia are very large, some with a space marked off in front, but most without any differentiation.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 2, portion of specimen, magnified, showing ovicells and avicularia.

PLATE 106, FIG. 3.

AMPHIBLESTRUM PERMUNITUM (HINCKS).

DESCRIPTION.—Zoarium very calcareous. Zoœcia variously shaped, wider in the middle, separated by raised, crenulated margins; secondary aperture occupying nearly half of the front of the zoœcia, somewhat quadrate, but wider below; front of zoœcium below the secondary aperture porcellanous, finely tubercular and crenulated at the edge. Avicularia on special tracts at the base of smaller zoœcia; mandible falcate, with an expanded base, directed obliquely upwards. Oœcia small, prominent, finely granular, with a crescentic smooth band about the junction of the upper with the middle third.

REFERENCE.—*Membranipora permunita*, Hincks, Ann. and Mag. Nat. Hist., Feb. 1881.

Port Phillip Heads; Portland, Mr. Maplestone.

I had previously (Trans. Roy. Soc. Vict. 1868) described this as *M. falcata*, but as my description was taken from a single imperfect specimen, it was scarcely exact enough. I have therefore adopted the name subsequently given to it by Mr. Hincks, who described it from better specimens. The whole zoarium is very calcareous, the calcareous lamina of the membranous aperture being thick and granular. The avicularia are very peculiar. They are situated on special tracts at the base of small, imperfectly developed zoœcia intercalated among the others. The mandible is falciform, the concave edge thick, the other formed by a thin membrane; it expands at each side at the base, like the cross-piece of the handle of a sword. The oœcia are prominent, globose, and divided by a concentric smooth band, the part below which is finely granular, the part above being smooth, or with coarser granulations.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 3, small portion of a specimen, magnified, showing an avicularium and two oœcia.

PLATE 106, FIG. 4.

PYRIPORA CRASSA (McG.).

[Genus PYRIPORA (D'ORBIGNY). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium adherent. Zoœcia distinct, thick, calcareous, convex, not separated by raised lines, narrowed below, in branched single series or forming continuous expansions; a large oblique aperture in front, filled by a thin membrane.]

DESCRIPTION.—Zoœcia large, much attenuated downwards, surface not annulated; aperture large, its margin thickened, with a thick, lip-like projection from the lower border.

REFERENCE.—*Hippothoa crassa,* P. H. MacGillivray, Trans. Roy. Soc. Vict. 1868.

Queenscliff.

Differs from *P. catenularia* in the thick projection from the lower margin of the aperture, and from *P. polita* in the absence of the thick lateral masses.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 4, portion of a specimen, magnified.

Pyripora forms a very natural genus, and was first proposed by D'Orbigny, but its species have generally been included in *Hippothoa*, with which it has no real connection, or in *Membranipora*. The chief distinction from the other Membraniporidæ consists in the zoœcia being very calcareous, thick, convex, much narrowed below, and not separated by raised margins. The habit also is to run in irregular, branching series.

PLATE 106, FIG. 5.

PYRIPORA CATENULARIA (JAMESON).

DESCRIPTION.—Zoœcia elongated, wide above, much narrowed below, arranged in linear or branching series, or occasionally aggregated; surface smooth or annulated; aperture oval or elliptical, occupying greater part of the expanded portion; margin flattened or bevelled, especially below.

REFERENCES.—*Hippothoa catenularia*, Busk, Cat. Mar. Pol. Brit. Mus., pt. i., p. 29, pl. xviii., figs. 1, 2; *Membranipora catenularia*, Hincks, Brit. Mar. Pol., p. 134, pl. xvii., figs. 1, 2.

Port Phillip Heads; Brighton.

I can detect no difference between this and the common European form. In my specimens the bevelled margin of the aperture is frequently granular.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 5, portion of a specimen in branching series, magnified.

PLATE 106, FIG. 6.

PYRIPORA POLITA (HINCKS).

DESCRIPTION.—Zoœcia very porcellanous, usually close together, narrowed downwards; aperture occupying about a third or more of the front; below the aperture a rounded or oval protuberance and on each side an oval or elliptical mass; sometimes these convexities are not distinctly marked, and there is occasionally a thickened collar all round the aperture, and there are sometimes several transverse markings across the front of the zoœcium.

REFERENCE.—*Membranipora polita*, Hincks, Ann. and Mag. Nat. Hist., Nov. 1880.

Queenscliff, on *Cymodocea antarctica*.

Very conspicuous from the highly porcellaneous character of the zoœcia with their polished convexities. At the growing extremity of one specimen the zoœcia spread irregularly in the manner of *P. catenularia*. I have little doubt that this is the species described by Lamouroux as *Cellipora alata*.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 6, small portion of specimen, magnified.

PLATE 106, FIG. 7.

ELECTRA FLAGELLUM (McG.).

[Genus ELECTRA (LAMX.). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting or filiform and erect. Zoœcia elongated, narrowed below, closely adherent together; lower part convex without distinct raised margins, perforated by numerous small foramina; aperture occupying the whole width of the zoœcium above, deep, with thick raised margins; one or more very large whip-like spines (occasionally replaced by an avicularium) below the margin of the aperture and a variable number of small sharp spines on its circumference.]

DESCRIPTION.—Zoœcia arranged in regular transverse series, elongate-quadrate; aperture occupying the whole width of the zoœcium above, its edge very prominent and thus causing the corresponding parts of the zoœcia to be separated by much-raised margins; lower part of zoœcium convex, surface closely pitted and extending a little further up one side than the other; a stout conical spine superiorly on each side; an enormous whip-like spine below the aperture to one side, and one or occasionally two small spines on the margin on the other side.

REFERENCE.—*Membranipora flagellum*, P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

Queenscliff, on stems of *Cymodocea antarctica*.

The only species with which this can be confounded is *E. pilosa*, from which it differs in the arrangement of the zoœcia in regular transverse series, in the lower part being produced more up one side of the aperture, and in the long spine being to one side. The oral opening is situated very deeply. The upper margin of the zoœcium forms a deep arched vault against the base of that above, and is surrounded by a continuation of the thickened rim of the aperture. All my specimens present the same arrangement, which is also slightly seen in some specimens of *E. pilosa*. It is possibly oœcial, and may consequently not be constant.

The present species, *Membranipora pilosa* and *E. verticillata*, constitute a well-marked generic group. In all three the zoœcium is of the same structure, the lower part, separated from its neighbours by a groove, is convex, covered with oval puncta or depressions. The aperture occupies the whole width of the upper part of the zoœcium, its margins thickened and those of contiguous zoœcia closely united. One large spine seems to be nearly constant (sometimes replaced by an avicularium) below the aperture, and there are other smaller spines on different parts of the margin. In *E. verticillata* the cells are trumpet-shaped, and the aperture consequently very oblique.

EXPLANATION OF FIGURES.

PLATE 106.—Figs. 7, 7*a*, portion magnified, the lower half the amplification of the upper.

PLATE 106, FIG. 8.

BATHYPORA PORCELLANA (McG.).

[Genus BATHYPORA (McG.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting. Zoœcia in longitudinal series, quadrate, separated by raised lines; lower part calcareous, convex, much projecting, smooth and imperforate; aperture occupying the whole width of the upper part, deep, membranous, with a narrow smooth lamina below.]

DESCRIPTION.—The zoœcia are quadrate, separated by narrow raised margins; the upper half is occupied by a membranous area, the membrane being situated at a considerable depth, with the flap-shaped mouth at the upper end; the lower half is prominent, smooth, white, calcareous, rising higher than the separating margin. The upper end of the zoœcium is in the form of a broad shallow arch hollowed out in the base of the prominent portion of that above.

REFERENCE.—*Membranipora porcellana*, P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Portland, Mr. Máplestone.

EXPLANATION OF FIGURES.

PLATE 106.—Fig. 8, portion of specimen, magnified. Fig. 8*a*, small group of zoœcia, more highly magnified.

PLATE 106, FIG. 9.

BIFLUSTRA PAPULIFERA (McG.).

[Genus BIFLUSTRA (D'ORBIGNY). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting or erect, foliaceous or cellular, uni- or bi-laminar; zoœcia depressed, elongated, separated by much raised, highly calcified, usually crenulated margins; aperture partially filled in below and occasionally on the sides by a calcareous usually granulated lamina, which generally slopes downwards from the margin.]

DESCRIPTION.—Zoarium encrusting. Zoœcia arranged in more or less regular, contiguous lines, narrowed below, oval; aperture very slightly filled in below; margin thickened, strongly crenulated, the lower part raised into a rounded prominence.

REFERENCE.—*Membranipora papulifera,* P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 9, group of zoœcia, magnified.

PLATE 106, FIG. 10.

BIFLUSTRA BIMAMILLATA (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia elongated; aperture elliptical, the edge formed by a thickened, crenulated rim; the lower part of the aperture occupied by a large plate or denticle sloping backwards and usually with a fissure or notch on one side; front of the zoœcium formed by a calcareous granulated lamina sloping inwards to the aperture; at the lower part of the zoœcium are two rounded prominences or mamillæ, or occasionally only a single transversely elongated mass.

REFERENCE.—*Membranipora bimamillata,* P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

The broad smooth plate at the lower part of the aperture is evidently of the same nature as the serrated denticle of *B. delicatula.*

EXPLANATION OF FIGURE.

PLATE 106.—Fig. 10, portion of specimen, magnified.

The descriptions and type specimens illustrated by this plate are from Mr. MacGillivray.

FREDERICK McCOY.

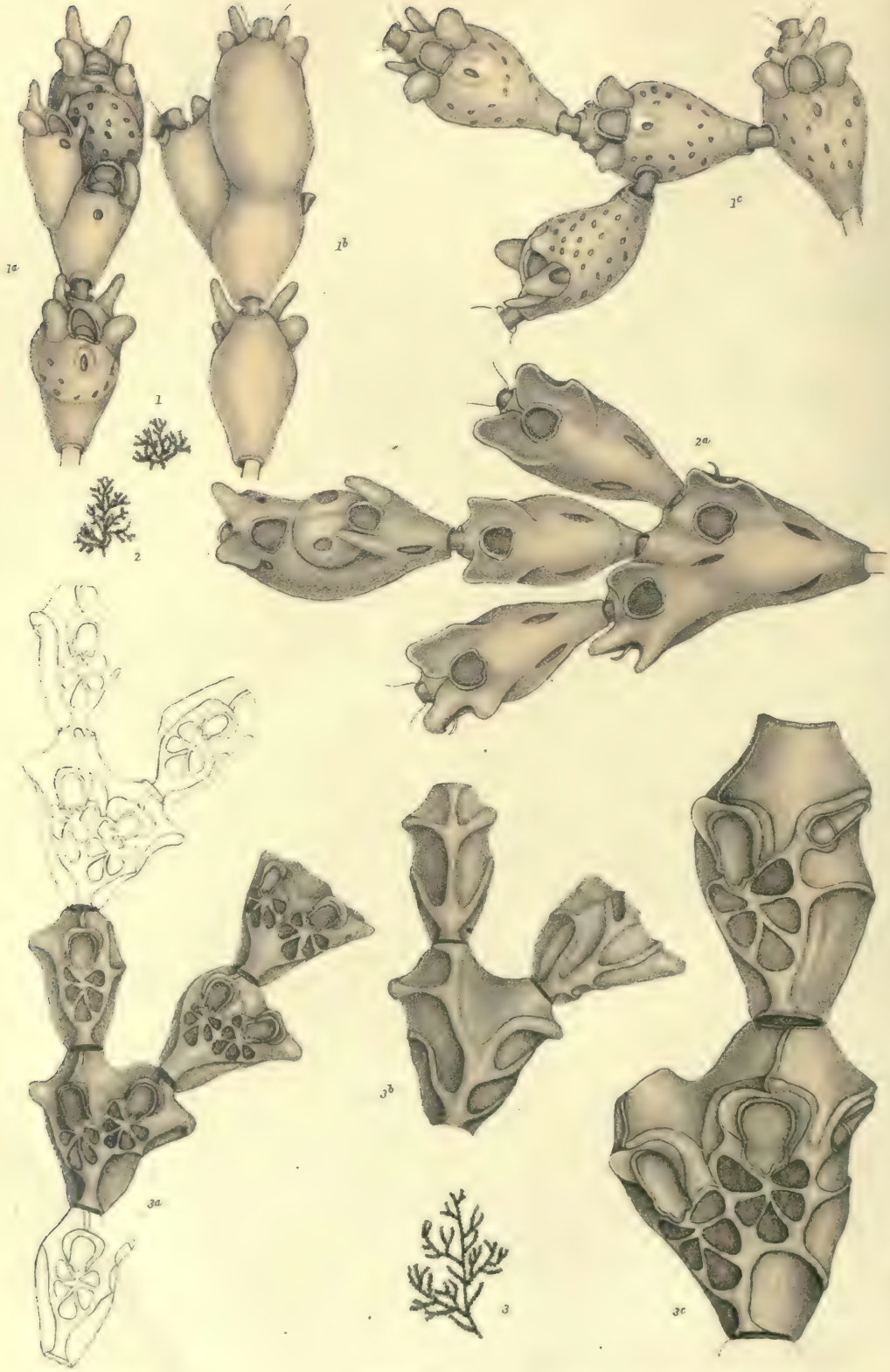

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PLATE 107, FIG. 1.

CATENICELLOPSIS PUSILLA (J. B. WILSON).

[Genus CATENICELLOPSIS (J. B. WILSON). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Catenicellidæ).

Gen. Char.—Polyzoary phytoid, erect, consisting of (usually) dichotomously divided, uniserial branches; cells all facing the same way, arising by short, corneous tubes from the upper and back part, or from the sides of other cells; cells at a bifurcation geminate, or a simple cell giving rise to the first of a series from its side; a small avicularium on either side superiorly.]

DESCRIPTION.—Cells ovoid; mouth lofty, arched above, straight below; a pair of long, blunt, hollow processes above the mouth, and another pair, shorter and thicker, opposite its lower part, with usually a minute avicularium at their bases externally; front with a rounded foramen below the mouth; surface smooth or minutely papillose; back smooth; ovicell immersed at the base of the upper of a group of three coalescent cells.

REFERENCE.—J. Bracebridge Wilson, Tr. Mic. Soc. Vict. 1880.

Spring Creek, near Geelong, Mr. J. B. Wilson.

This species forms small glassy tufts, growing on other polyzoa and algæ. The cells are ovoid, slightly curved forwards. The mouth is lofty and slopes backwards. Above and behind the mouth is, on each side, a long, blunt, digitiform process, and more anteriorly, opposite its lower half, is a shorter, thicker, and usually curved, similar process, which frequently has a small avicularium on its outer aspect. On the front of the cell is a round or oval opening raised on a slight elevation. The cells usually extend in linear series from the upper and back part of those preceding; but they frequently originate by short, corneous tubes from their sides. The branches arise from the cells of a geminate pair, from the sides of single cells in a series, dichotomously from a single terminal cell, or in three series from a geminate pair. The ovicell is immersed in the base of the upper of a tricellate group, which is either terminal or at a bifurcation. It is covered with tubercles or raised pores.

EXPLANATION OF FIGURES.

PLATE 107.—Fig. 1, specimen, natural size. Fig. 1*a*, small portion, magnified, showing tricellate group and ovicell. Fig. 1*b*, posterior view of the same. Fig. 1*c*, small portion, showing the origin of cells and branches from the sides of other cells.

PLATE 107, FIG. 2.

CATENICELLOPSIS DELICATULA (J. B. WILSON).

DESCRIPTION.—Cells elongated; mouth arched above, hollowed, slightly bulging below; on each side a broad avicularian process, directed outwards and forwards, extending from the summit of the cell to opposite the lower lip, and with a deep excavation lodging an avicularium; surface smooth; a short narrow, sub-lateral vitta on each side; posterior surface finely sulcate; ovicell globular, sub-immersed in the base of the upper of two coalescent cells.

REFERENCE.—J. Bracebridge Wilson, Tr. Mic. Soc. Vict. 1880.

Spring Creek, Mr. J. B. Wilson. Port Phillip Heads.

This, like the last, occurs in small, glassy, parasitic tufts. The cells are elongated, and have on each side a small sub-lateral vitta. There is also on each side a broad, lateral process, directed considerably forwards, the outer part of which has a deep cup containing an avicularium. The ovicell is cemented to the base of the upper of two coalescent cells, the lower of which has, in the place of the usual avicularian process, a stout, blunt, digitiform prolongation.

EXPLANATION OF FIGURES.

PLATE 107.—Fig. 2, specimen, natural size. Fig. 2*a*, small portion, magnified, showing ovicell and origin of three branches from a geminate pair.

I am doubtful whether *Catenicellopsis* ought to be separated from *Catenicella*. The character on which the genus has been founded is the frequent origin of the cells and branches from the sides of the cells, and not always from the summits of the cells of geminate pairs, as seems invariably to occur in the true *Catenicellæ*.

PLATE 107, FIG. 3.

CALPIDIUM PONDEROSUM (GOLDSTEIN SP.).

[Genus CALPIDIUM (BUSK). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Catenicellidæ.)

Gen. Char.—Polyzoary phytoid, erect, branched; branches consisting of series of cells all facing the same way, connected by corneous tubes; each internode consisting of a single cell, or of a median primary cell and a lateral, on one or both sides, united side to side; mouth contracted about the lower third, its upper margin very prominent and projecting; an avicularium on each upper angle of an internode.]

DESCRIPTION.—Polyzoary consisting of long, straggling branches; each internode containing a single cell, or two laterally coalescent; cells elongated, narrow, with five fenestræ on the front of each; an avicularium at each upper angle of the internodes; posterior surface with a vertical band, and two lateral pairs springing from it; ovicell large, galeate, terminal.

REFERENCE.—*Catenicella ponderosa*, Goldstein, Tr. Mic. Soc. Vict. 1880.

Port Phillip Heads.

Forms tufts of considerable size. The branches are much more slender and straggling than in the next. Each internode usually consists of only a single cell, but very frequently there is also a coalescent one on the side. It is to be expected that a second lateral cell sometimes occurs, but I have not observed it in any of the specimens examined. The cells are long, and narrower than in *C. ornatum*. On the back, in the single-celled internodes, there is a vertical, thickened band, with a pair of similar bands extending from its lower part obliquely upwards and outwards to the edge, and another short pair going horizontally outwards from the upper part. The arrangement of the bands in the double-celled internodes varies. The ovicell is large, galeate, on the summit of a terminal cell. The cell on which it is situated is narrower and smaller than the others, and has the fenestræ more elongated. The posterior surface has some slightly elevated bands. The

external envelope is very calcareous and brittle, easily separating in fragments or as a shell from the internal parts, and then giving the appearance described and figured by Goldstein.

EXPLANATION OF FIGURES.

PLATE 107.—Fig. 3, branch, natural size. Fig. 3*a*, portion, magnified, showing single- and double-celled internodes. Fig. 3*b*, back view of a portion of the same. Fig. 3*c*, small portion, more highly magnified, to show the form of the mouth.

The type specimens and descriptions of the species on this plate have been contributed by my friend Mr. MacGillivray.

FREDERICK MCCOY.

J. Ripper del. et lith.

Prof. M.c Coy direx.

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PLATE 108, FIG. 1.

CALPIDIUM ORNATUM (BUSK).

DESCRIPTION.—Polyzoary consisting of broad, closely set branches; internodes of three, or occasionally of two, laterally coalescent cells; cells very large, with five large fenestræ on each; posterior surface with a central, thickened band, corresponding to the middle of the median cell, and two pairs of transverse bands going at right angles from this, the upper again dividing.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Pol., p. 15, Pl. XII. and XIII.

Port Phillip Heads, seemingly very rare.

The only specimen I have, which I dredged in about 15 fathoms, forms a thick tuft, about 3 inches high. The branches are broad, closely set, flat, almost penniform in arrangement. The internodes, which are broad and urn-shaped, usually consist of three coalescent cells, but occasionally one lateral is wanting. At each upper angle, whether the internode consists of two or three cells, is a large avicularium. Almost the whole front of each cell is occupied by 5 fenestræ, separated by raised bands. The posterior surface is marked by a vertical, thickened band, corresponding to the central line of the median or primary cell; from this two pairs of bands are given off at right angles, the upper of which again gives off another branch, which ascends vertically and then turns horizontally outwards.

The ovicell, for specimens of which I am indebted to Mr. J. B. Wilson, very much resembles that of *Catenicella plagiostoma*. It is terminal, of great size, equalling in width the preceding tricellular internode, with the summit of the middle cell of which it is connected by a short tube. It is obscurely triangular in outline, with the apex produced into a simple, sharp, or bifid process. On the front is a prominent vertical ridge. The opening is very wide, looking downwards and slightly forwards; the margin is thickened, especially anteriorly, where it forms a broad collar. A specimen, which is unfortunately somewhat damaged, mounted in balsam, shows a shallow operculum with its

base supported by two calcareous processes rising vertically from the thickened posterior margin of the mouth.

It is at once distinguished from the last by its much larger size, more massive appearance, the usually tricellate internodes, and the different sculpture on the back.

EXPLANATION OF FIGURES.

PLATE 108.—Fig. 1, portion of branch, natural size. Fig. 1*a*, front view of two internodes, magnified. Fig. 1*b*, portion of branch in outline, to show internodes of two and of three cells. Fig. 1*c*, back of single internode.

The genus *Calpidium* was founded by Busk to contain *C. ornatum*, the character being that "it is distinguishable by the anomalous circumstance that each cell is furnished with two or more, usually with three distinct keyhole-shaped mouths, and is doubtless inhabited by three distinct individuals." The genus is a very marked and natural one, but the real distinction is not in the number but in the structure of the mouths. The mouth is lofty, contracted about the junction of the middle with the lower third; above this the margin is very prominent, and projects as a hood or collar, slightly hollowed in the centre above, from which point (in the median or primary cells) a narrow ridge runs upwards. Each internode consists of a primary cell, either single, or with an additional cell added on one or both sides. The cells of a series, except at a bifurcation, always arise from the summit of a primary cell. At a bifurcation in *C. ornatum* one branch springs from the primary cell, the other from one of the laterals, which has also a vertical ridge above the aperture; while in *C. ponderosum* both cells at a bifurcation have a similar ridge. In continuous series, where the internodes are double-celled, the secondary cell seems to be always developed on the same side. At each upper angle of the internode, whether consisting of 1, 2, or 3 cells, there is a considerable avicularium.

Catenicella aurita and *C. geminata* have the mouth of a similar shape, but destitute of the raised margin. They ought, I think, to be separated as a distinct genus.

PLATE 108, FIG. 2.

CHLIDONIA DÆDALA (WYV. THOMSON).

[Genus CHLIDONIA (SAVIGNY). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Chlidoniidæ.)

Gen. Char.—Polyzoary phytoid, erect, rising from a creeping stolon; cells in single series, rising from the joints of an articulated, non-celliferous stem, all opening the same way.]

DESCRIPTION.—The stem of each colony rises by a corneous tube from a disk on the dilatation of a creeping, anastomising stolon. It consists of a series of long, calcareous cylinders connected by corneous tubes. The upper internode divides into two, each division originating a branch extending in a curved direction outwards, upwards, and forwards. These are divided into calcareous internodes connected by corneous tubes, as in the primary stem. A certain number (2–7 or 8) of the internodes give origin superiorly to the first cells of an erect series. The lateral branch ends in a simple or divided tendril-like filament, jointed in the same manner. The cells are arranged in erect, linear series, each connected to the upper part of the preceding by a short, corneous tube. The number varies from 1 to 5 or 6 in each series, being greatest in those nearest the bifurcation of the central stem. The ultimate cell of each series usually gives rise at its summit to a tendril-like prolongation of similar structure to the extremities of the lateral branches. The cells are wide above, narrowed below, laterally compressed, and very much bulging posteriorly. The anterior surface is flattened, the greater part occupied by a thinner, depressed area separated by distinct margins. The large mouth, situated at the upper part, is rounded above and straight below. Below the mouth there is usually a small, round foramen. Some of the cells are much larger, but not otherwise different, and are probably ovicelligerous.

It is a very minute species growing on other polyzoa, chiefly *Bicellaria*. When extended, the whole has a very beautiful appearance, resembling a two-branched candelabrum.

It was made the type of a new genus by Wyville Thomson (Dubl. Nat. Hist. Rev. 1858), and described as *Cothurnicella dædala*. It is, however, exceedingly closely allied to the Mediterranean *Eucratea cordieri*, and will probably prove to be a luxuriant form of that species. As, however, the only specimen I have of the latter is not in a very good state of preservation, I am unable to decide positively. Waters's description (Ann. and Mag. Nat. Hist., Feb. 1879), the only one with which I am acquainted, would precisely apply to our species.

D'Orbigny (Paléontologie Française, and V. Bryozoaires, p. 40) first defines *Chlidonia*, referring to the name as given by Savigny

on one of his plates, and to Audouin's explanation of the plate as *Eucratea cordieri*. As priority seems to be with Savigny's name, and *Eucratea* has by different authors been made to include other species generically distinct (*Scruparia chelata*, *Alysidium Lafontii*, *Crisidia cornuta*), it is, I think, better to follow D'Orbigny.

EXPLANATION OF FIGURES.

PLATE 108.—Fig. 2, specimen, natural size. Fig. 2*a*, specimen, magnified. Fig. 2*b*, lateral half of another specimen, more highly magnified.

The specimens and descriptions of these two curious forms are from Mr. MacGillivray.

FREDERICK McCOY.

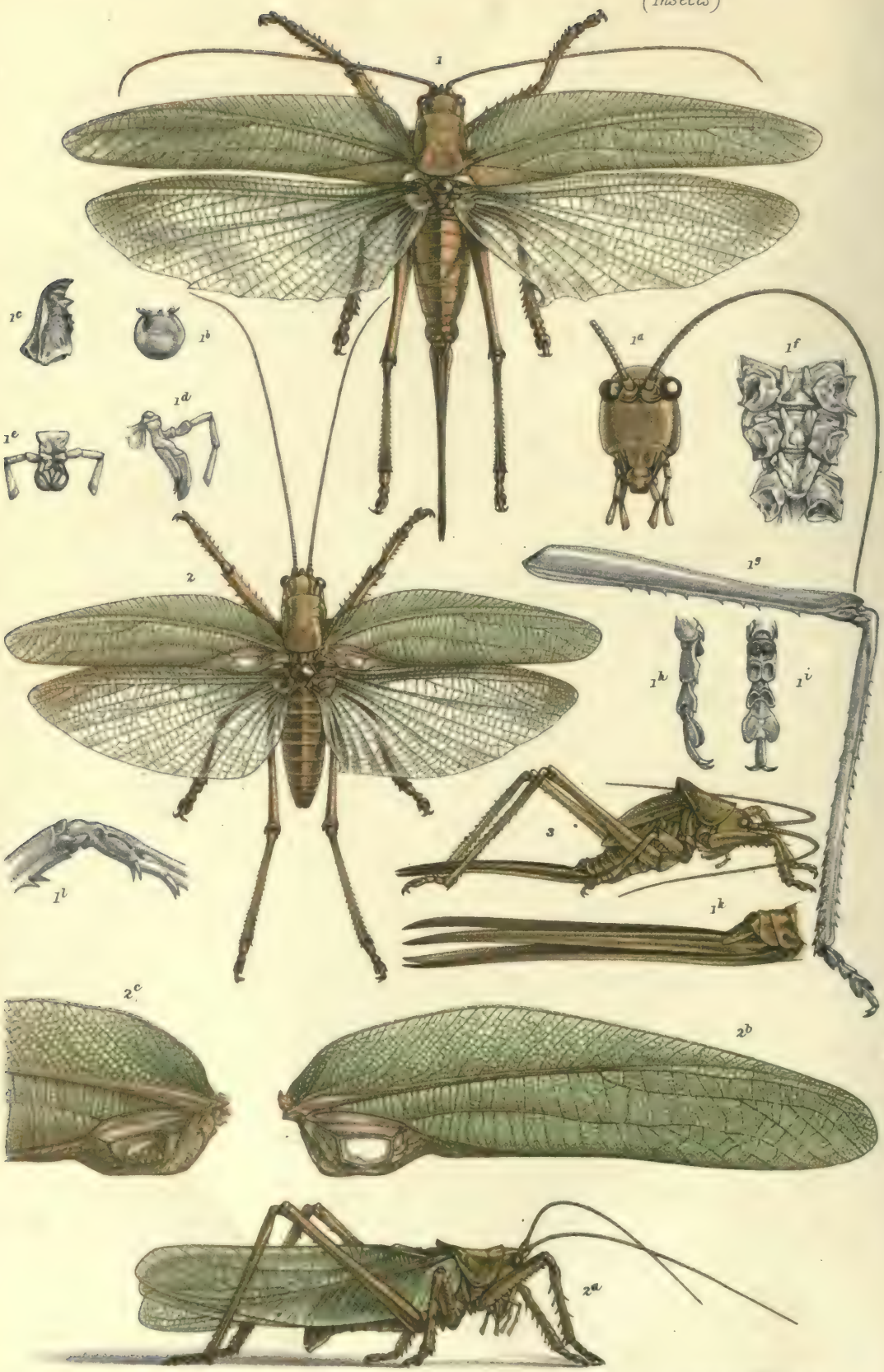

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PLATE 109, FIGS. 1–3.

LOCUSTA VIGENTISSIMA (SERV.).

THE GREAT GREEN GUM-TREE GRASSHOPPER.

[Genus LOCUSTA (FABR.). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Fam. Gryllidæ).

Gen. Char.—Head vertical, front flattened, sides rounded, smooth, unridged, upper front margin projecting between bases of antennæ in a short, conical tubercle. Antennæ setaceous, longer than the body, closely approximated at base; 1st joint* as large as the frontal tubercle; 2nd joint short. Eyes globular; ocelli none. Labrum small, rounded at tip; mandible strong; maxillary palpi much longer than the labial; terminal joint scarcely, or but little, larger than the preceding, moderately widened at tip, and obliquely truncated. Legs long, slender; thighs very slender, slightly spinous below; anterior haunches with a curved spine on outer side; anterior pair of tibiæ in both sexes with a swelling on the outer side of the basal joint, containing a hollow which is in great part covered over with a semioval lobe; the 4 anterior tibiæ strongly spinous; posterior tibiæ with fine, close, numerous, minute spines on the two upper keels, in addition to those below; tarsi 4-jointed, the 3rd with 2 very large lobes, basal and 2nd joint with smaller lobes. Prothorax with a flat disc, obscurely keeled at the deflexed sides, a little narrowed in front; presternum with 2 long, straight, close spines; meso- and metasternum each divided longitudinally by a wide sulcus, each side bearing a conical, pointed tubercle. Tegmina long, rounded at tip, extending beyond the tip of the abdomen; stridulating spot of right one transparent and glossy in middle; hind wings equalling the tegmina in length. Abdominal appendages thick, short; sub-anal plate in male bent upwards, not extending beyond the abdomen, with lateral, setaceous appendages; ovipositor very long, narrow, straight, a little wider at base; valves 6, pointed, slightly hollowed above.]

DESCRIPTION.—*Male:* Head yellowish-brown, with a green patch on each side; tubercle between bases of antennæ conical, horizontal, divided by a mesial groove; front of head and labrum ferruginous tawny-yellow; maxillary and labial palpi green in most specimens. Eyes large, very prominent, yellowish-brown, mottled. Prothorax tawny-brown above, saddle-shaped, nearly smooth, with a few transverse lines above; deflected sides green, rugosely pitted, and wrinkled; each of the three segments of the sternum with 2 conical spines, those of the front segment most slender and acute. Tegmina, or anterior wings, dull "gum-leaf" green, with the longitudinal vein very thick, prominent, and yellowish-brown; stridulating, bright, mica-like organ at base of left (or upper, when at rest) tegmina, very large, iridescent, opaline, surrounded by ridged, rugged, yellowish-brown margins, that of right tegmina with very bright, central spot; hinder wings transparent, almost colorless, tinged with green, veins green, equalling the tegmina in length when at rest, and extending nearly half their length beyond the abdomen; under part of body and all the legs yellowish-brown, tinged with greenish below and at the joints above; femora of all the legs channelled below, the bounding ridges set each with a row of small spines, very much smaller on the posterior thighs than on the four anterior ones; keels of the tibiæ set with curved, sharp spines, much larger on the two anterior pairs than on the posterior pair; cavity in swollen base of anterior tibiæ reduced to a long, narrow slit; antennæ extending about one-fourth of their length beyond the end of abdomen, of a brownish color. Length of male from

* I notice a perforated papilla, or foramen, on the anterior or lower base of the basal joint of the antennæ, like the opening to the ears in the base of the large antennæ of the Macrourous crustacea, and these, I think, may also be the organs of hearing; the positions of which have not as yet been indicated in insects.

between eyes to end of abdomen, 1 in. 6 lines; length of each tegmina, 1 in. 11 lines, to 2 ins. 1 line; length of antennæ, 1 in. 11 lines; length of appendages, from bifid anal plate, about ½ line; length of two upper appendages, 1½ lines. The sub-pentagonal, horizontal, inner basal angle of tegmina containing the stridulating organ is about as long as the head and prothorax, and of the same brownish color in some, greenish in others; the rest of the tegmina abruptly deflexed. Proportional measurements: *Male*—Length of tegmina, 1 in. 10 lines; length from fore part of head to end of abdomen, $\frac{82}{100}$; length of antennæ, $\frac{99}{100}$; length of hind thigh, $\frac{60}{100}$. *Female:* Coloring as in the male, except the inner angles at base of tegmina, which are minutely reticulated, and of the same consistence and color as the rest of the tegmina. Length from base of antennæ to end of abdomen, excluding ovipositor, 1 in. 4 lines to 1 in. 7 lines; ovipositor, 1 in. 4 lines; appendages above base, 1 line; length of hind thigh, 1 in. 3 lines; length of hind tarsus, 1 in. 3 lines; length of each tegmina, 2 ins. 3½ lines; expanse from tip to tip, 4 ins. 6 lines; greatest width of tegmina, 6½ lines. Proportional measurements (length of tegmina taken as 100): greatest width of tegmina, $\frac{25}{100}$; length of hind wing, $\frac{91}{100}$; greatest width, $\frac{35}{100}$; length of antennæ, $\frac{95}{100}$; length of prothorax, $\frac{19}{100}$; length of ovipositor, $\frac{60}{100}$; length of hind thigh, $\frac{55}{100}$.

REFERENCE.—Audinet Serville Hist. Nat. des Ins. Orthop., p. 530.

The family of *Gryllidæ*, or the Grasshoppers, is composed of a number of genera of insects often confounded with the *Locustidæ*, or the Locusts, to which they are most nearly allied, but from which they may be easily distinguished by the more slender body, the very long antennæ, exceeding the body in length, and the abdomen of the female being terminated by a very long, stiff, multivalve ovipositor, about as long as the abdomen; and the base of the anterior wings or elytra of the male having usually each a round talc-like spot (unsymmetrical, the right differing from that of the left side), for producing the peculiar chirping song or call for the female. This latter structure is surrounded with prominent veins, those of the under-side of the left one being most prominent and lying over the right one when the wings are closed; the sound being produced by rubbing the bases of the wing-cases one over the other. In the Grasshoppers generally the legs are long and slender, and the delicate wings usually extend far beyond the end of the abdomen when folded at rest. The anterior tibiæ of both legs have an oval pit closed by a talc-like plate in the slightly dilated base; the functions of these curious peculiarities being unknown, although Claus in his Lehrbuch der Zoologie suggests they may be the organs of hearing. This from their position and want of otolites is unlikely (and I have suggested the cavity opening in the basal joint of the antennæ to be the organ of

hearing as in the macrourous *crustacea*). The long ovipositor of the female is composed of six pieces, and can be thrust to its full depth into the earth, and then separated to allow the eggs to pass between them ; the female after depositing a few eggs withdraws the ovipositor, and bores into another spot. Unlike the Locusts and the Field Crickets, which keep chiefly on the ground, the Grasshoppers frequent the branches of trees in moist places, feeding on the leaves, which they generally resemble in color ; most species, therefore, being green, and not variegated with the gay colors so often seen in the Locusts. The Grasshoppers of any species are not so numerous as the Locusts in individuals, and—not forming swarms—are not dreaded as plagues.

The young, on escaping in spring from the egg laid in autumn, are like the parents, except in size, and wanting the wings. At first the two sexes are alike, but after the first moult (about two months old) the ovipositor of the female begins to grow. In the pupa condition they resemble the larvæ in shape and activity, but have rudimentary wings projecting a little way from the second and third joints of the thorax. Their hearing is very acute, as the males stop their song on the slightest noise.

It is unfortunate that the generic name *Locusta* should be applied to a highly typical group of Grasshoppers congeneric with the present fine species, differing altogether from the Locusts in the very long antennæ, long ovipositor of the females, and the stridulating, mica-like organ at base of tegmina of males. The generic name *Phasgonura*, applied to them by Prof. Westwood, has not the priority, or else it would be preferable.

The pupæ of the male and female resemble the adults, except that the elytra and wings are not more than half the length of the abdomen.

This *L. vigentissima* of Australia is so like the *L. viridissima* (Linn. sp.), or Great Green Grasshopper of France and England, in general appearance and many details of structure that it would be easy to mistake one for the other if the great difference of locality did not draw attention to the valid specific distinctions which really exist. It is one of the singularly close imitations

giving rise to the theory of representative species. It exemplifies the fact that one country of given temperature and other geographical characteristics may have indigenous animal inhabitants so nearly resembling in size, shape, color, and habits some inhabitants of an inaccessibly distant country of like character (without appearing in the intervening localities), that, each animal being suited to its surroundings, and those geographical circumstances being alike, one might fancy that the species should also be alike. As they certainly are not the same, the one species seems as if made on the pattern of the other, or to imitate it so nearly as to give rise to the general recognition of the fact involved in the theory of "Representative Species."

This fine Grasshopper is not very uncommon on gum-trees everywhere in Victoria, the male making a loud shrilling noise in summer. It has not been figured before.

Explanation of Figures.

Plate 109.—Fig. 1, female, natural size, in flying position. Fig. 1*a*, head, magnified two diameters, to show broad, smooth face without keels or ocelli. Fig. 1*b*, upper lip, magnified three diameters, to show simple, rounded edge. Fig. 1*c*, mandible, magnified three times, to show strongly-toothed edge. Fig. 1*d*, maxilla, magnified three times, to show bifid point, hood, and palpus. Fig. 1*e*, labium, magnified three times, to show quadrifid tips and palpi (these two figures accidentally inverted in lithographing). Fig. 1*f*, sternum, twice natural size, showing two conical spines on each segment between bases of legs. Fig. 1*g*, hind leg, twice natural size, showing smooth thigh. Fig. 1*h*, four-jointed tarsus, magnified three diameters, viewed sideways. Fig. 1*i*, ditto, viewed from below, showing division of basal joint, magnified three times. Fig. 1*k*, six-valved ovipositor of female, magnified two diameters, showing valves slightly separated, and the appendages at base. Fig. 1*l*, portion of anterior tibiæ, magnified three diameters, to show elongate drum at base, partly covered over by inflection of surface. Fig. 2, male in flying position, natural size. Fig. 2*a*, same, in resting position, side view. Fig. 2*b*, right elytron, or tegmen, of male, magnified two diameters, to show neuration, and the large, rounded, clear, talc-like spot of the stridulating organ at base, with the coarse, prominent ridges round it. Fig. 2*c*, portion of left elytron, similarly magnified, to show the difference of the stridulating organ. Fig. 3, female pupa, natural size, showing the shortness of elytra and wings, characteristic of the immature state.

Frederick McCoy.

ZOOLOGY OF VICTORIA

(Insects)

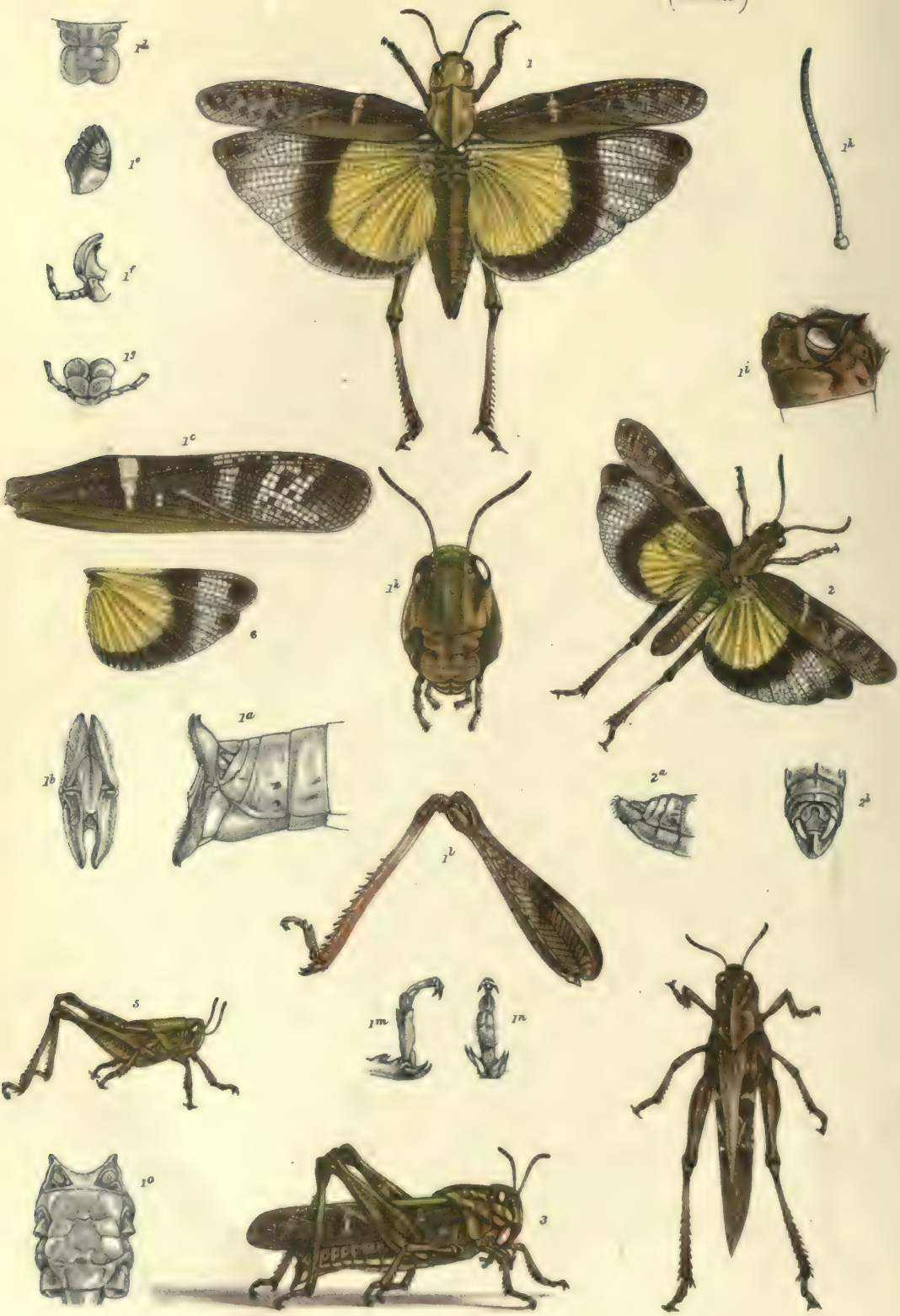

PLATE 110, FIGS. 1–6.

ŒDIPODA MUSICA (FAB. SP.).

AUSTRALIAN YELLOW-WINGED LOCUST.

[Genus ŒDIPODA (LATR.). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Fam. Locustidæ.)

Gen. Char.—Head vertical, or nearly so; anterior face convex, with four vertical keels, two median close, outer ones lateral; eyes large, oval; ocelli three, one between the two median keels, below base of antennæ, and the others at inner edge of eye between the median and lateral keels, above the base of the antennæ. Antennæ multiarticulate; joints indistinct, cylindrical, shorter than head and thorax. Prothorax moderate; disc flat, with a median keel and another, less distinct, on each side; anterior half transversely striated. Three sternal pieces between the legs, wide, not armed with spines, smooth, flattened. Feet moderate; four anterior tibiæ, spinose below; posterior pair with two rows of spines above, except at base; tarsi 3-jointed, with first joint longest, divided into 3 parts below, the last joint with a very small cushion between the claws. Abdomen thick, long, moderately compressed, terminated by four short, pointed pieces, in the female; sub-anal plate of male extending slightly beyond the end of the abdomen, triangular, pointed, and a little curved upwards, convex below; abdominal appendages short, setaceous. Anterior wings, or tegmina, usually longer than the abdomen, opaque towards the base, with all the transverse nervures almost equally fine, anterior margin narrow; never dilated nor transparent; posterior wings usually nearly as long as the tegmina.]

DESCRIPTION.—Head brownish- or yellowish-green, a polished, black, triangular spot below the eye and outside the outer keel and the base of the antennæ; mandibles bluish at base, with black tips; prothorax brownish in front, pea-green behind in most specimens, but occasionally dark brown; keel dark brown, and one or two black blotches on sides; tegmina extending beyond the abdomen when at rest, basal half of posterior margin nearly opaque and pea-green in most specimens, brown in others, middle and anterior portions dark brown, with one conspicuous, narrow, transverse, whitish, transparent band about one-third of length from base, with an imperfect, similar band or spot about half-way between base and tip; distal half more transparent, irregularly mottled with transparent, pale brown, irregular spots and dark brown nervures. Posterior wings a little shorter than tegmina, with basal half rich sulphur-yellow, with a slight greenish tinge, beyond which is a broad, brownish-black, opaque band curving from middle of anterior edge to anal angle, where it narrows; beyond this, the wings are transparent, nearly colorless, with brown nervures and a few dusky spots near tip, but very variable, sometimes forming a large, cloudy, apical spot. Abdomen, antennæ, and anterior feet greenish tawny-brown; inferior groove of hind thigh bright red; tarsi and tibiæ dull red, with a yellowish band near base of tibiæ; thighs greenish, with a large blackish, dull red, or purple transverse band on inner side. Length, 1 in. 5 to 6 lines; length of tegmina, 1 in. 2 lines to 1 in. 6 lines; width of thorax between bases of tegmina, 3 lines; length of hind wing, 1 in. $1\frac{1}{2}$ lines; length of antennæ, $5\frac{1}{2}$ lines; male smaller and with proportionately longer antennæ, otherwise similar to females, length 1 in. 1 line; length of antennæ, $5\frac{1}{2}$ lines. Proportionate measurements—*Female* (large specimen): length, 1 in. 7 lines; tegmina, $\frac{90}{100}$; hind wing, $\frac{87}{100}$; antennæ, $\frac{30}{100}$. *Male:* Length, 1 in. $1\frac{1}{2}$ lines; tegmina, $\frac{99}{100}$; hind wing, $\frac{87}{100}$; antennæ, $\frac{43}{100}$. *Vars.*—The coloring varies considerably, especially in the proportion of green and brown on the head and thorax, the darkness of the brown mottling on the tegmina

and the greater or less distinctness of the mottling or obscurity of the tip of the hind wings. The two most distinct and persistent varieties are the common one, with thorax, and hind margin of tegmina, pea-green, and the other with those parts testaceous brown. The green is also sometimes absent from the thighs, which are then brown, irregularly banded with darker. In other respects the varieties agree.

REFERENCE.—*Gryllus musicus*, Fabr. Ent. Syst., v. 2, p. 55 = *Gryllus pictus*, Leach, Zool. Misc., v. 1, t. 25.

The family *Locustidæ*, or the true Locusts, embracing all the migratory sorts, includes a number of genera differing from the *Gryllidæ*, or Grasshoppers, in the females not having the long exserted ovipositor; and in having the antennæ short, not half the length of the body, and of only 20 to 30 joints, and either cylindrical or fusiform or clavate in shape. The head has three ocelli, or small simple eyes, usually, but never less than one, while they are absent in the Grasshoppers. The tarsi are only 3-jointed, instead of 4-jointed as in the Grasshoppers. The wings in the Locusts never have the talc-like, eye-like stridulating organ at the base of the right anterior wing or tegmen of the male, but produce their song, or shirring chirp, by the totally different method of rubbing the hind femora and tibiæ against the hard anterior edge of the deflexed anterior wings or tegmina, the insect standing on the four anterior legs while rapidly scraping the thighs up and down like the bow of a fiddle against the raised edge of the wing-covers; the thigh of one side being used alternately with that of the other.

Connected apparently with this mode of singing is another structural peculiarity found in all Locusts (of both sexes), and not in Grasshoppers; this is a semi-oval drum-like cavity (see our Fig. 1*i*) just above and behind the base of the hind leg on each side in the last thoracic segment, with a bright reflecting internal plate partially crossing the cavity; the whole apparently intended to increase the resonance of the sound produced by the scraping of the hind legs on the wing-case edge.

The great size of the muscular thighs of the posterior pair of feet enables the Locusts to jump much higher, further, and more readily than the Grasshoppers, giving an example of muscular power almost unparalleled in the animal kingdom. The hind legs are not used for walking, which is effected by the four anterior feet,

the great jumping posterior pair being held up in ordinary slow walking. This is perhaps the reason why Moses counts the locusts amongst four-footed animals that may be eaten.

The long boring ovipositor of the Grasshoppers is replaced in the Locusts by four short conical plates, two above and two below, the upper ones a little concave above, the lower conoidal. Another general peculiarity of the *Locustidæ* in which they differ from the Grasshoppers is the great width of the middle and hinder sternal pieces of the thorax, separating widely the middle and hinder legs of the right side from those of the left side.

The wonderful migrations of countless millions of individuals of several species of this group—the Locusts—at certain times of the year, in various countries, especially North Africa, Arabia, India, China, and even the warm parts of Europe, have been the subjects of records the most ancient, interesting, and important of all popular references to insects. In most of the countries named, the flights or migrations are approximately from E. to W. (in Victoria they are generally from N. to S.), chiefly carried on by the action of strong winds blowing at the time, as the power of the wings for flight is not great, and the creatures seem to have little or no power of directing their flight, so that the great clouds of locusts raised, and mainly carried, by the wind are unable to avoid a river in their course ; and as each individual's flight is for the most part short, the insects falling into such rivers are in many cases described as forming putrefying heaps of dead bodies many feet high and many miles long, creating a pestilence, while the flight itself often darkens the noon-day sky so that one could not see to read in the houses for hours. When they all alight, as they do at sundown, every trace of green vegetation disappears as if by magic, from the action of their voracious jaws, the places where they pass seeming as if burnt up—the Latin name *Locusta* being derived *(locis ustis)* from the parched arid appearance wherever they have been. In nearly all ancient writers the popular or local names of Locusts have reference to their appearance in myriads, or their destructive voracity. For instance, the old Hebrew name for these, *Arbeh*, refers to their multitude at the times of migration ; in Sanskrit,

Patanga, refers to the jumping and advancing of the swarms; the Chinese names have all the same meaning; the Greek, ακρις, refers to the belief that they came from the tops of the mountains; and the Arabic, *Djarâdoun*, is from their gnawing or plucking away every green thing.

The astonishing multitudes of individuals which appear at one time, and apparently march or fly over the land nearly in one direction, constitute in all countries a constant character of these scourges or plagues, and is not clearly explicable at present. The passage is only partially effected by the wings, which are only capable of holding up the body for a short distance; the prevailing winds are really the most powerful agents for carrying forward these clouds of Locusts, described by all observers; and it is entirely to the power of currents high in the air that the passage of clouds of Locusts over hundreds of miles of sea is sometimes observed when they fall on ships at sea hundreds of miles from land.

The eggs are generally deposited in autumn in the earth, in parcels of fifty or sixty, slightly glued together. In spring the young appear without tegmina or wings; and, jumping with the hind legs, or walking slowly with the four anterior ones, increase in size, and devour most kinds of vegetation, with a gradual development of wings at each moult or change of skin, until the autumn, when the flights or migrations take place on the perfection of the wings of a considerable proportion of the individuals. These are always accompanied by a multitude of imperfect younger individuals with short, undeveloped wings, travelling as pedestrians—the "Füssgangers," as the Germans, and the Dutch Boers in Africa, call them.

Prepared in various ways, the Locusts make good food, especially if mixed with honey, which makes them more easy of digestion; some nations boiling them with butter; others roasting the bodies, after taking off the legs and wings, and, with the addition of salt, either eating them fresh or potting them up preserved for future use. Sparmann mentions how fat the delighted Hottentots grow when the Locusts arrive in due season. Many of the lower animals, birds, and mammals, even lions, feed largely on them.

As Fabricius does not mention the color of the wings of his *G. musicus*, and subsequent writers have quoted that species also from India and the Cape of Good Hope, where I do not think the Australian species occurs; while, on the other hand, Leach's *G. pictus* is unmistakably our insect, and has never been quoted from any other country, I should have been glad to use Leach's specific name, if it were not certain that Sir Joseph Banks's specimen was our species, and Fabricius's name, founded on that specimen, has the priority.

Very common everywhere in Victoria in the latter part of the summer.

Explanation of Figures.

Plate 110.—Fig. 1, female, natural size, flying. Fig. 1*a*, side view of end of abdomen of ditto, magnified three diameters, showing the down-turned lower pair of appendages and up-turned upper pair of oviducal plates. Fig. 1*b*, end view of ditto. Fig. 1*c*, tegmen or anterior wing, magnified twice, to show veining and absence of stridulating organ at base. Fig. 1*d*, bilobed upper lip or labrum, magnified three diameters. Fig. 1*e*, powerful, serrated first jaw or mandible, magnified three diameters. Fig. 1*f*, slender, bidentate maxilla or second jaw, with hood and 5-jointed palpus, magnified three diameters. Fig. 1*g*, lower lip or labium, with 4-jointed palpi. Fig. 1*h*, one of the antennæ, magnified three diameters. Fig. 1*i*, side view of anterior segments of abdomen, to show the stridulating cavity, with its tense membranous cover over base of hind legs, magnified three diameters. Fig. 1*k*, front view of head, to show the four vertical keels and position of the three stemmata, or small simple eyes, magnified two diameters. Fig. 1*l*, hind leg, magnified two diameters, to show the chevron-grooving. Fig. 1*m*, side view of 3-jointed tarsi, magnified three diameters. Fig. 1*n*, under view of ditto, to show apparent division of the basal joint. Fig. 1*o*, sternum with bases of six legs, to show wide, flat, smooth, middle and hind segments, and narrow, unarmed front joint. Fig. 2, male, natural size, flying, to show its smaller size and proportionally longer antennæ. Fig. 2*a*, side view of end of abdomen of male, magnified three diameters, to show the upward-curved sub-anal plate and small appendages. Fig. 2*b*, ditto, viewed from above, showing pair of small appendages with up-turned end of sub-anal plate between them. Fig. 3, female, natural size, side view. Fig. 4, female, natural size, viewed from above, of variety, with thorax and basal or inner margin of tegmina brown, to show the overlapping of the left anterior wing upon the right when at rest. Fig. 5, pupa, natural size, to show short wings and tegmina. Fig. 6, hind wing, natural size, of very small specimen, to show range of dimensions.

Frederick McCoy.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XII.

BY

FREDERICK McCOY, F.R.S.,

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PREFACE.

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This twelfth Decade gives illustrations in the first plate of two varieties and the young of the commonest of the Lizards found near Melbourne, the *Grammatophora muricata*, absurdly called "Blood-sucker" by the colonists.

The second plate gives the detailed illustrations of the parts of the Antarctic representative of those curious fish, so interesting to geologists, the *Chimæræ;* this species, the *Callorhynchus Antarcticus* being often called Elephant Fish by the fishermen.

The third plate is devoted to details of both sexes of that famous and most peculiar Shark, the Port Jackson Shark or Cestracion, the *Heterodontus Phillipi*, the teeth of which resemble many ancient fossil forms found in the Palæozoic Rocks of Europe, which would be inexplicable but for the existence in our day of this Australian type, in the opinion of many authorities, who see a nearer affinity than I do.

The Fish figured on the fourth plate, the *Trachichthys Australis*, is so rare that the type specimen in the British Museum, imperfectly described eighty years ago, has remained unique until Count Castelnau and myself each recently obtained an example, enabling me now to give a careful figure from the fresh specimen.

Plate 115 illustrates a newly discovered kind of Sea-Pike, the *Lanioperca mordax*, of a genus peculiar to this part of Australia.

The three next plates continue the series of Polyzoa, the specimens and descriptions of which have been contributed by my friend Dr. MacGillivray to the National Museum and this work.

Plate 119 figures for the first time, with details of both sexes, an abundant Gum-tree Grasshopper, of the family *Gryllidæ*, contrasting, by the shortness of the ovipositor, with that of the family *Locustidæ*, figured on Plate 109.

The last plate gives figures of both sexes of a very rare form allied to the preceding, but of a different sub-genus.

The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest, and of which good figures do not exist or are not easily accessible.

FREDERICK MCCOY.

21st July, 1886.

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PLATE 111.

GRAMMATOPHORA MURICATA (SHAW SP.).

THE BLOOD-SUCKER.

[Genus GRAMMATOPHORA* (KAUP). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Strobilosaura. Family Agamidæ.)

Gen. Char.—Body moderate, subtrigonal or slightly depressed in section. Head large, trigonal, obtusely pointed in front, depressed; sides flattened, and separated from the top by an angle, covered with small, irregular, unequal, keeled, scale-like plates. Nostrils lateral, under the lateral angle, a little behind tip of snout. Ear-drum large, rounded. Tongue short, flat, narrow, spongy, notched at tip. Teeth:—molars, short, semioval, compressed, on edge of jaw bone, 5 incisors in middle, and 2 canines on each side above, 4 incisors below. Throat not pouched; with a strong transverse fold between its base and front of thorax. Scales of back imbricated, unequal. Femoral and preanal pores large, numerous. Tail long, conical, tapering, depressed at base, with keeled, imbricated scales. Toes slender, the 4 first gradually increasing in length, the 5th a little shorter than the 2nd; subdigital scales transversely keeled very strongly. Australia.]

DESCRIPTION.—Body moderate; head small, nearly an isosceles triangle; a strong keel from tip of snout over orbit to hind margin of eye; nostril half way between tip of snout and the anterior angle of eye; occipital plate scarcely larger than those surrounding it on head and nape; tail more than twice as long as head and body, slender. One row of small, contiguous, triangular, keeled spines along midline of back, largest near origin at occiput, smallest at termination over base of tail; on each side, at a distance of two ordinary scales, a row of large similar scales, mostly separated by the length of one or two of the small, ordinary body scales, these two lateral rows converging, running close together, where midline ends at base of tail, continued as two approximate, conspicuous, small keels for first fourth of tail, beyond which they are undistinguishable from the rest of the strongly keeled scales of the tail; a similar outer row of keeled spines extends from half way between midline and shoulder, ending at first fourth of base of tail; between the 2 lateral rows and outside the outer one are several, irregularly scattered, similar, but slightly smaller, triangular, keeled, spinose scales, very rarely forming a slightly marked, outer, lateral, additional line; ordinary scales of back rhombic, keeled, the keels stronger and forming continuous longitudinal ridges on tail; scales of belly and throat similar, but more faintly keeled; a row of keeled spines, like those of back, extends from eyebrow behind eye, over the ear; a similar, short, ridge-like row under the ear; and one from each side of occiput extending obliquely backwards and downwards to outer lateral row of body; a few spinose scales on upper side of thigh and front of leg; scales on front of arm and top of head imbricated, strongly keeled. Preanal pores 3 or 4 on each side; femoral pores 3 or 4 on each side, not reaching half the length of the thigh. *Color:* Varying from pale brownish ash to dark olive brown above, the space between the inner lateral rows traversed by the keeled serrated midline, usually mottled irregularly with darker; sides irregularly mottled with dark brown on lighter greyish-brown ground; 2 rows of 6 or 7 large, conspicuous, brownish-black, triangular spots run along the back, the base of each

* I continue the use of Kaup's generic name for these Lizards, instead of *Amphibolurus* of Wagler adopted by Boulenger in his recent important work, because where so many cases of applying one name to two or more genera exist, I do not think Stephens having used this one first for a genus of small moths is likely to produce any serious confusion.

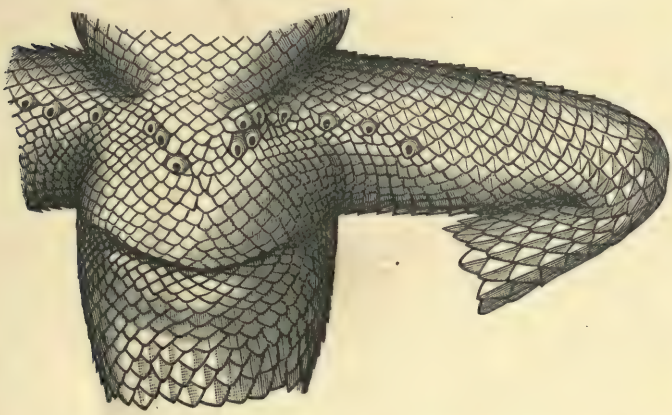
coinciding with the median lateral keels, the apices directed outwards; the broad, longitudinal space between the inner and outer row of spinose keels much lighter in color than the rest of the back, and either divided into a row of large, lateral, oval spots on each side, by the apices of the black triangular marks extending to meet a similar smaller row of blackish triangular spots, having their bases on the outer lateral row of spines and their apices inwards; or forming a more or less continuous longitudinal pale band on each side where the triangles are disconnected; the 2 inner rows come together to form lozenges or rhombs over basal fourth of tail where these two ridges approach; hinder three-fourths of tail, legs, and thighs with rather distant, transverse, dark bands, those of tail usually 6 or 8 scales wide, with lighter intervals 2 or 3 scales wide, but sometimes narrower than the light bands; top of head with 5 or 6 narrow, transverse, chevron-like, dark brown bands starting from an irregular midline; a broad dark band extends from the eye, enclosing the ear; a black angular spot half way between shoulder and ear; under side of throat and belly either plain pale ashy-grey or (sometimes) dark grey, or (more usually) mottled irregularly with darker grey. From 3 to 4 femoral pores irregularly spaced on basal half of each thigh, and 3 to 4 on each side preanal ones. Iris dark brown; inside of mouth and tongue yellow. 2 canines and 11 molars on each side above. About 12 labial plates on each side; rostral hexagonal, 3 times wider than high; chin plate large, pentagonal, with nearly equal sides. Moderate specimen, 1 ft. 1 in. total length; tip of snout to occiput 1 in., to ear 1 in. $\frac{1}{2}$ line; width of head, 11 lines; tip of snout to shoulder 1 in. 7 lines, to thigh 3 ins. 7 lines, to vent 4 ins.; length of tail, 9 ins.; width of body, 1 in. 3 lines; width of tail at base 6 lines, at half its length, 3 lines; length of arm 9 lines, of forearm 7 lines; longest toe and claw, 6 lines; length of thigh, 1 in.; leg, 1 in.; longest toe and claw from base of hind toe, 1 in. 1 line. Toes slender, third anterior one nearly as long as the fourth; third posterior one only two-thirds as long as the fourth.

REFERENCE.—=Muricated Lizard, White Jour. Voy., t. 31, fig. 6; = *Lacerta muricata*, Shaw Gen. Zool., v. 3, pt. 1, t. 65, f. 2; = *Grammatophora*, id. Kaup Isis, 1827, p. 621; =*Agama Jacksoniensis*, Guer. Icon. Reg. An., t. 3, f. 1.

With the exception of the variations in color above noted, this pretty little Lizard varies very little. The absence of bearded scales on throat and across the occiput, and the invariably present, small, median row of keeled scales along back, distinguish it readily from the young of *G. barbata*. The resemblance is much closer to the *G. angulifera* (of which I have many specimens before me from Western Australia), which is, when adult, of nearly the same size (though more slender) and much alike in coloring. But this latter species, which I have not seen in Victoria, is easily distinguished by its comparatively very short tail, little exceeding the body in length, while it is more than double the length in *G. muricata*. The average proportion of tail to the total length in *G. muricata* is $\frac{75}{100}$, while in *G. angulifera* it is only $\frac{53}{100}$; the base of the tail in *G. angulifera* is also much wider, and has a conspicuous lateral line of 6 or 7 large spinous tubercles on each side, not

found in *G. muricata.* The tail, it should be mentioned, is shorter in the young than in the adult of this species. The head of *G. muricata* is more slender than in *G. angulifera*, in which latter the femoral pores are more numerous and closer, making a nearly continuous line across the lower part of body. The femoral pores of the present species are, as in the woodcut, sometimes 3 on one thigh and 4 on the other, and the preanal pores are sometimes 3 on one side and 4 on the other in the same individual. In some specimens of *G. angulifera* there is a slight indication of a median dorsal keel, but it is usually absent; it is present always in the long-tailed *G. muricata.*

To show the irregularity of the preanal and of the femoral pores, I give here a woodcut of a specimen, magnified two diameters, from the Goulburn District, in the Museum, showing 3 femoral pores on one thigh and 4 on the other, and 3 preanal pores on one side and 4 on the other.



This is the commonest Lizard about Melbourne, especially in the sandy districts on the south coast, where it may often be seen, as represented in our plate, on a stump of Tee-tree, which it resembles in colors and marking so nearly that it is almost impossible to distinguish it, unless the sun happens to glance from its bright eyes. When seen it will remain so immovable as almost to induce a belief that it is a withered stump; but if your eye should leave it for an instant, it is gone like a flash. It is fond also of basking in the sun on sandy paths, &c. The eggs are laid in the sand.

Why the popular name of "Blood-sucker" should be so universally given to this harmless creature by the colonists (except on

the *lucus a non lucendo* principle) I cannot conceive. In confinement it feeds readily on flies, and makes an elegant little pet in a Wardian Fern-case.

Explanation of Figures.

Plate 111.—Fig. 1, adult specimen, natural size, of the variety with lateral bands broken into rows of oval spots, in its customary attitude on a stump of Tee-tree. Fig. 1*a*, head and part of the neck, viewed from above, magnified two diameters, to show the character of scales. Fig. 1*b*, hind foot, magnified two diameters, to shôw character of scales on under-side. Fig. 1*c*, anterior foot, magnified two diameters, to show the transverse keeling of the scales on under-side. Fig. 1*d*, scales of back, magnified two diameters. showing the middle and two lateral rows of keeled scales. Fig. 1*e*, young, natural size, showing the shorter tail as compared with the adult. Fig. 1*f*, variety with darkly mottled under-side, and partially continuous light bands on side of back instead of the oval light marks of usual variety, natural size.

Frederick McCoy.

PLATE 112.

CALLORHYNCHUS ANTARCTICUS (LACÉP. SP.).

THE SOUTHERN CHIMÆRA.

[Genus CALLORHYNCHUS (GRONOVIUS). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Elasmobranchia. Order Holocephala. Family Chimæridæ.)

Gen. Char. — Body semifusiform, tapering from the head, laterally compressed; tail elevated, heterocercal, caudal fin on underside only; head with the snout produced into a long proboscis, of median and two lateral cartilages, terminating in a wide, thin, ovate, skinny flap; anterior dorsal fin with a long, compressed, serrated, bony spine on its anterior edge; second dorsal with a longer base; anal fin small, deep, triangular, close to the caudal; pectoral very large, triangular; skin smooth, except two rows of minute spines usually felt between the dorsals; pupil elliptical, vertical. *Dentary plates:* Anterior of upper jaw thick, narrow, pointed in front; grinding surface in both jaws large; male with a small frontal appendage between the eyes, with bifurcate base, lodged in a cavity, both cavity and tip of appendage set with numerous small, recurved spines.]

DESCRIPTION.—Pectoral reaching a little beyond the base of the ventral fins; first dorsal commencing slightly behind the gill-opening, and origin of pectoral; second dorsal commencing over front edge of ventrals; dorsal spine nearly twice the length of the space from its base to corner of orbit, bare in its whole length, compressed, gently curved backwards, posterior edges finely serrated on apical third of length; skinny flap at end of snout ovate, broad end down, with rounded margins, twice as long as wide. Lateral line slightly undulating from extremity of tail, running along its lower margin, taking an abrupt turn upwards a little behind front edge of caudal to a little behind the eye where it branches, one branch going over the eye forwards nearly to tip of snout, giving off a branch behind the eye crossing top of head to join that of other side at an acute angle directed backwards; lower branch going forward under the eye and sending one branch along side of proboscis, one to anterior part of mouth, and one to angle of mouth, and one backwards to a little in front of gill-opening extended by a few pores, as if to join that from the other side, but interrupted in the middle under the throat. *Color:* Body bluish-grey lead color with silvery lustre; under surface whitish; a black upper margin to orbits; a black trigonal spot in front of dorsal fin, with base behind, and apex reaching between eyes; a black band on each side of base of first dorsal uniting into a broad mesial band along middle of back to sides of second dorsal, and thence along midline to end of tail, receiving a small lateral branch from under hind half of second dorsal; dorsal, anal, and caudal fins brownish, with blackish tips and margins; ventrals brownish with blackish base; pectorals brownish below, blackish towards margins, black above, brownish at base. Iris green; front of snout-flap flesh color.

MEASUREMENTS.	Ft.	ins.	lines.
Length from tip of proboscis to end of caudal fin	2	7	0
" " " base of proboscis	0	2	3
" " " anterior edge of orbit ...	0	4	7
" " " anterior base of 1st dorsal ...	0	8	2
" " " " " 2nd dorsal ...	1	4	2
" " " " " pectoral ...	0	7	3
" " " " " ventral ...	1	2	2
" " " " " anal ...	1	9	3
" " " " " caudal ...	1	10	10
" of spine	0	5	4
" of base of 1st dorsal	0	2	9
Height of 2nd dorsal	0	3	0

Measurements—*continued.*	Ft.	ins.	lines.
Length of base of 2nd dorsal	0	5	6
„ of pectoral	0	8	0
Greatest width of pectoral	0	3	6
Depth of ventral	0	3	6
Greatest width of ventral	0	2	11
Depth of anal	0	3	0
Greatest width of anal	0	1	3
Greatest depth of caudal (anterior lobe)	0	2	2
Space between 1st and 2nd dorsal	0	5	6
„ „ 2nd dorsal and caudal	0	2	3
„ „ pectoral to ventral	0	6	6
„ „ ventral to anal	0	6	3
„ „ anal to caudal	0	0	4
Diameter of orbit	0	0	11
Length of snout	0	2	3
„ of ovate flap	0	1	11
Greatest width of flap	0	0	11
Depth of body	0	4	6

Reference.—= *Callorhynchus* (Gronov.), Mus. Ichth., v. 1, p. 59, t. 4 = *Chimæra callorhynchus*, Lin. Syst. Nat. = *Chimæra Antarctica*, Lacép. Hist. Poiss., v. 1, p. 400, t. 12, f. 2 = *C. Australis*, Shaw Gen. Zool., v. 5, p. 368 = *C. Tasmanius*, Rich. Trans. Zool. Soc., v. 3, p. 696.

The two rows of spines on the back between the dorsals may be distinctly felt in most of the large female specimens, but they are not perceptible in a male specimen of smaller size before me. The pectorals seem slightly smaller in the males, and do not extend quite so far towards the ventrals. The curious grasping organ on the forehead of the male arises by a widely bifurcate base between the eyes a little behind the anterior edge of the orbit ; its middle portion is oblong, about three-fourths the diameter of the orbit in length, about half as wide as long, narrowed and rounded towards the front, where it is very convex below and set with recurved spines; the hollow into which it can be depressed is set with recurved spines at its anterior end.

This fish is tolerably common along the coast, and is frequently called Elephant Fish by the fishermen.

Explanation of Figures.

Plate 112.—Fig. 1, side view of female specimen, one-fourth of the natural size. Fig. 1*a*, the same, viewed from above, to show the shape of the black markings and course of the porous lines on top of head. Fig. 1*b*, front view of head, natural size, to show the position of the nostrils and grinding plates of mouth, the added outline showing position of the flap of the snout. Fig. 1*c*, side view of dentary plates of upper and lower jaws, natural size. Fig. 1*d*, dentary plates of upper jaw, grinding surface, natural size. Fig. 1*e*, inner view of grinding surface of dentary plates of lower jaw, natural size. Fig. 1*f*, side view of flap at end of snout, natural size. Fig. 1*g*, front view of ovate snout-flap, natural size. Fig. 1*h*, side view of frontal grasping process of male, half the natural size, shewing the tooth-like spines at its distal end, raised up from the spinose cavity, into which it fits. Fig. 1*i*, side view of dorsal spine, natural size. Fig. 1*k*, section of dorsal spine.

Frederick McCoy.

1.
1b
1c
1a
2.
2a
2b

PLATE 113.

HETERODONTUS PHILLIPI (LACÉP. SP.).

PORT JACKSON SHARK, OR BULL-DOG SHARK.

[Genus HETERODONTUS (BLAINV.) = CESTRACION (CUV., not KLEIN.) (Sub-kingdom Vertebrata. Class Pisces. Order Chondropterygii. Sub-order Plagiostomata. Tribe Selachoidei. Family Heterodontidæ.)

Gen. Char.—Ovate, fusiform; head large, blunt, rounded in front, high, cuboid, with a prominent longitudinal ridge over each eye; mouth narrow, nearly terminal; upper lip divided into 7 lobes (1 median and 3 on each side); lower lip with one long fold on each side; nostrils confluent with mouth cavity; spiracles very small, below and behind the eye. Gill-openings small. Teeth alike in both jaws, the median front rows very small, acutely tricuspid when young, simple and with obtusely triangular cusp in middle age, blunt and hexagonal when old; more posterior teeth large, oblong, longer than broad, flattened, arranged in oblique, spiral rows on each side of jaw, the anterior and posterior ones smaller than those in middle. *Fins:* Two dorsals, each with a small, smooth spine on front edge, anterior dorsal between pectorals and ventrals, posterior dorsal in front of anal. Shagreen spines, or granules, of skin irregularly stellate on upper surface. East and West Pacific and Indian Oceans.]

DESCRIPTION.—Form semifusiform, tapering rapidly from the head to the tail. Head large, about as high as broad, bluntly rounded in front, muzzle short; two prominent, bluntly rounded ridges arise, one on each side, beginning about over the first gill-slit, arching over the eye and descending with the slope of the profile (which is nearly straight at an angle of about 40° from longitudinal midline) to about over angle of mouth, bounding a deep concavity along top of head; their distance apart about equal to distance from anterior edge of orbit to upper end of first gill-opening; height of head at orbit about one-seventh of total length, including caudal fin; length of head from tip of snout to first gill-opening about one-sixth the length of body; mouth and nostrils nearly terminal on under-side; upper lip as wide as head, divided into three lateral lobes, the outer one large, longitudinally oblong, flat, overlapping under lip, next a nearly circular spirally involute lobe going nearly round the large nostril, and next a broad rounded lobe; the middle occupied by a thin semicircular edge exposing the anterior median rows of teeth, which are prominent; lower lip with a long fold on each side from angle to the middle, exposing the median rows of teeth in front. Spiracle minute, about the vertical diameter of the orbit below hind margin of eye. Orbit twice as long as wide, close under the ridges on the upper margin of the sides of the head; pupil longitudinally horizontal, elliptical. *Teeth:* Upper and lower jaws alike, but a few more rows in upper than lower jaw; quadrate, oblong in front, the rami widening so as nearly to touch about the middle of their length, leaving an ovate median space, beyond which they narrow and divaricate to the back; teeth in about 27 rows, about 12 rows of about 13 teeth each, longitudinal, and slightly diverging in front, each tooth of which is very small, triangular, transversely ovate, front ones blunt, forming acutely angular simple erect cusps farther back, and most acute, and with 1 or 2 lateral cusps in young teeth behind; 7 or 8 rows spirally arranged obliquely on each ramus from within, forwards and outwards, of large, flattened, slightly convex teeth, obliquely rhomboidal, each with a narrow longitudinal ridge nearer the outer margin, and having the surface sculptured with transverse vermicular ridges and small pits; teeth of the fifth row from the back largest, all longer than wide. *Fins:* Pectorals very large, about one-fifth the length of the fish, width about two-thirds the length; posterior edge nearly

straight, posterior angle rounded; front edge of first dorsal slightly in front of, and vertically over the posterior base of pectorals, trapezoidal, front margin rounded, about as long as from its base to acute posterior angle; hind edge obliquely truncated, concave; second dorsal about one-third smaller than the first, of the same shape, origin behind the base of the ventrals, and terminating in front of anal, nearer to anal; anal more than the length of its inner margin in front of caudal, similar in form to second dorsal, but smaller; caudal obliquely truncated, with its lower part divided into two lobes by a deep quadrate notch, upper lobe separated from the lower by the end of the body; ventrals trapezoidal, nearly equidistant between the first and second dorsals. Spines in front of dorsal fins strong, basal two-thirds covered with skin, exposed point smooth, compressed, triangular in section, reaching about half the height of the fin, growing thicker with age. Skin with the shagreen points irregularly cruciform on back and sides, globular on throat and on lower tip of pectorals. *Color:* Reddish-brown above, pinkish-yellow below; a dark brown band crosses top of head and eyes passing down cheeks towards corner of mouth; a broad brown band runs along middle of back from occiput to first dorsal, then dividing obliquely outwards and backwards to upper surface of ventral fins, and giving off a branch to the pectorals, inclosing a light, triangular space over posterior base of pectorals; another dark medial band extends along back from anterior dorsal on each side of second dorsal to tail; pectorals and ventrals blackish-brown above, pinkish on edge below; dorsal and anal fins lighter; iris greenish-brown. (The brown dark bands are most distinct on the young, nearly or quite obsolete on the old, and invisible on stuffed or spirit specimens.) The caudal fin is relatively larger in young than in old individuals.

MEASUREMENTS.

	Large Female.			Small Male.		
	Ft.	ins.	lines.	Ft.	ins.	lines.
Total length	3	8	0	2	9	0
Length from tip of snout to corner of mouth	0	3	4	0	2	0
Width of mouth	0	4	0	0	2	1
Tip of snout to anterior edge of orbit	0	4	8	0	3	3
„ „ posterior edge of orbit	0	5	9	0	4	1
„ „ first gill-opening	0	7	5	0	5	5
„ „ anterior base of pectoral	0	10	3	0	7	0
„ „ anterior base of first dorsal	1	1	6	0	9	3
„ „ posterior „ „	1	4	6	0	11	9
„ „ anterior base of ventral	1	10	0	1	2	8
„ „ „ „ second dorsal	2	2	6	1	7	3
„ „ posterior „ „	2	5	0	1	9	3
„ „ anterior base of anal	2	6	6	1	10	7
„ „ posterior „	2	8	0	1	11	6
„ „ anterior edge of lower lobe of caudal	3	0	6	2	2	7
Distance of spiracle from middle of posterior edge of orbit	0	1	0	0	0	7
Width of head at vertical of eye	0	7	0	0	4	5
Height at same to superciliary ridges	0	6	7	0	3	10
Space between superciliary ridges	0	3	4	0	2	5
Length of anterior edge of pectoral	0	8	2	0	6	3
Outer edge of ditto	0	7	7	0	5	5
Exposed portion of spine of anterior dorsal	0	0	10	0	0	8
Antero-posterior diameter of same	0	0	4	0	0	3
Transverse posterior diameter of same	0	0	2½	0	0	2
Anterior edge of first dorsal	0	4	3	0	3	7
Posterior „ „	0	3	3	0	2	8
Exposed portion of spine of second dorsal	0	0	10	0	0	8
Antero-posterior diameter „	0	0	4	0	0	2½
Transverse posterior diameter „	0	0	2½	0	0	1½
Anterior edge of second dorsal	0	3	9	0	2	11
Posterior edge of same	0	3	1	0	2	5

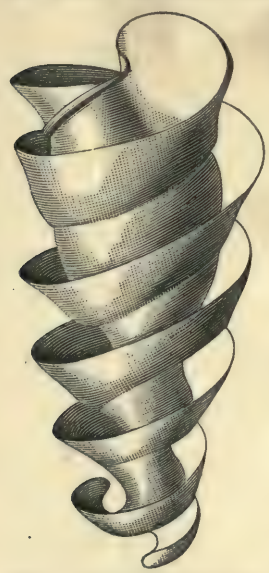
MEASUREMENTS—*continued.*

	Large Female.			Small Male.		
	Ft.	ins.	lines.	Ft.	ins.	lines.
Anterior edge of ventral	0	3	6	0	2	6
Posterior edge of same	0	3	7	0	2	3
Anterior edge of anal	0	3	6	0	2	7
Posterior edge of same	0	2	2	0	1	10
Anterior edge of lower lobe of caudal	0	5	0	0	3	7
Upper lobe above end of vertebral line	0	2	0	0	1	10
Number of stellated spines of skin in 3 lines on head	Seven			Seven		

REFERENCE.—=Port Jackson Shark, Phillip's Voy., p. 283 = *Squalus Phillipi*, Lacép. Poiss., v. 1, p. 218 = *Cestracion Phillipi*, Cuv. R. A. = *Heterodontus Phillipi*, Blainville, Nouv. Bul. Sc., 1816, p. 121.

In the admirable descriptive and illustrated memoir on the *Heterodonti*, by Baron Miklouho-Maclay and Mr. W. Macleay, in the Proceedings of the Linnæan Society of New South Wales (Vol. III., pt. 4), the interesting fact is announced of all the teeth, both front and lateral, being small, sharp-pointed, and with one or two lateral cusps, in the young a few inches long; showing a resemblance to those of *Notidanus*, the two anterior cusps being more perpendicular.

This Shark, so famous amongst zoologists and geologists under the name of *Cestracion*, or Port Jackson Shark, is called the Bull-dog Shark by Victorians, from the form of the head and muzzle. No other Shark has any approach to the extraordinary structure, shape, and arrangement of the teeth of this genus, which has been taken by Agassiz and Owen as illustrating in our time the European fossil genus *Cochliodus* of the Carboniferous Limestone formation; to which, in my opinion however, the relationship is not really close. It is common in Hobson's Bay. The stomach is filled with fragments of shells. There are only two eggs at a time, laid once a year. These eggs are very remarkable objects, not uncommon on the shore; they are conical in shape, about 6 inches long, and surrounded with two broad keels extending spirally and obliquely round the egg from one end to the other, like six turns



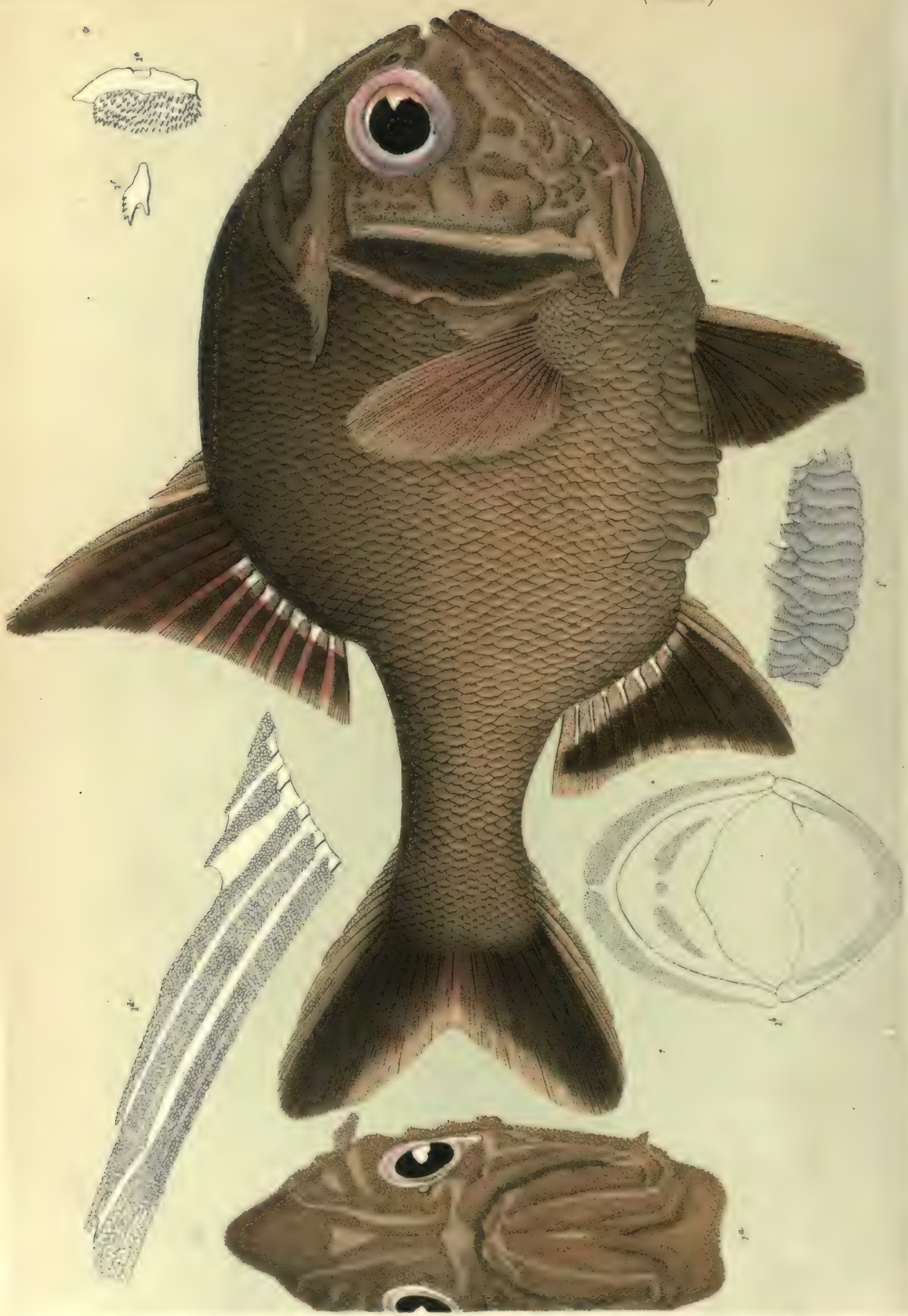
Egg; half the natural size.

of a broad screw; the substance is of a tough, dark brown, horny appearance. The stellated form of the shagreen is quite unlike that of any other genus of Sharks.

EXPLANATION OF FIGURES.

PLATE 113.—Fig. 1, side view, male, reduced. Fig. 1*a*, anterior view of head, mouth closed, showing the form of the lobes of the lips in front, and exposure of teeth above and below. Fig. 1*b*, teeth of lower jaws, natural size. Fig. 1*c*, mouth widely opened, to show similarity of dentition above and below. Fig. 2, female, reduced. Figs. 2*a* and 2*b*, irregularly stellated shagreen of head and body, magnified.

FREDERICK McCOY.



A. Bartholomew del. et lith. Prof. McCoy Direct. Ferres. Govt. Printing Office

PLATE 114.

TRACHICHTHYS AUSTRALIS (SHAW).

AUSTRALIAN ROUGH FISH.

[Genus TRACHICHTHYS (SHAW). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Family Berycidæ.)

Gen. Char.—Ovate, compressed; muzzle very short, semioval; cleft of mouth oblique; chin projecting a little in front of upper jaw; eye very large; teeth very fine, villiform on jaws, palatines, and vomer. Eight branchiostegal rays. A very long, strong spine extending backwards from supra-scapula; a small triangular one on upper margin of operculum, and a large one on basal angle of preoperculum; scales semielliptical, roughly granular, serrated at edge, and with upper and lower ends of anterior edge prolonged into flat, smooth, triangular spines on covered portion; scales of lateral line not larger than adjacent scales; a row of very large compressed scales forming a strongly serrated edge to abdomen. One dorsal; ventral with six rays; caudal forked. Australasia.]

DESCRIPTION.—Height of body about once and three-fourths in total length from chin to base of caudal; dorsal and ventral outlines from tip of snout to level of dorsal fin, forming two nearly similar curves, the dorsal higher. Head semi-elliptical; diameter of eye two and a half in length of head; mouth reaching under middle of eye, supra-maxillary reaching to vertical of hind edge of orbit; posterior nostril vertical, ovate, close to anterior edge of orbit; 2 lateral and 1 narrow, mesial, smooth, vertical bands on forehead, middle widening into a cordate space above; intermediate spaces and all the bones of the head and the 4 lower branchiostegal rays rough with close, irregularly arranged, spinose granules, without distinct radiated arrangement; supra-scapular spine very large, rough, with spinose granules passing to flexuous ridges at point; a broad, flat, very obtuse, triangular spine on upper margin of operculum, and a longer, stronger, and more acute, triangular, flattened spine at basal angle of preoperculum. *Teeth:* A broad band of very numerous, very minute, villiform teeth on upper and lower jaws, an ovate band of similar teeth on each palatine bone, and a round patch of the same on the vomer. *Scales:* 65 from operculum to base of caudal, and 24 from dorsal to ventral; rhomboidal, twice as high as long, those of lateral line not conspicuously larger than the adjacent ones; 12 very large between bases of ventral fins and anus, forming a strongly serrated keel to abdominal edge, the first anterior one obtuse, the others progressively more compressed and prominent; all the scales strongly pectinated on hind edge, and rough with spinulose granules. Lateral line indistinct, descending from under base of supra-scapular spine, with a slight curve to middle of tail. *Fins:* Dorsal, with 4 spines (the first little larger than a scale), and 11 broad branched rays, the first branched ray highest, the others rapidly shorter, the 6 latter nearly equal, and half the height of the triangular anterior portion; anal with 3 spines and 10 branched rays (2 last with one base), the 6 hind rays lower than the 3 anterior ones, first longest; caudal deeply bilobed, notch angular, lobes semioval, with 6 shorter rays above and 5 below, simple; 9 above and 7 below, thick, flat, branched; pectorals

quarter of an oval, of 13 rays; ventrals broad, trigonal, of 1 spine and 6 branched rays; all the fin-rays, spinous and branched, rough, with short, spinulose granules. *Color:* Whole surface of a rich tar-brown, with a vertical tawny-yellow band from supra-scapular spine to spine at base of preoperculum, the throat and pectoral lighter and with a rusty-red tinge, and the ventral blackish-brown with anterior spines yellowish; dorsal with spines yellowish, high triangular anterior portion blackish-brown, posterior lower portion reddish-chestnut brown, with a conspicuous yellowish-white, nearly colorless and translucent band at base, less than one-third the height of the fin, with a narrow lighter edge; middle lobe of caudal blackish-brown, upper, lower, and middle margins yellowish; anal blackish-brown, with a narrow, lighter edge and a light band, yellow and less translucent than that of the dorsal, at base, from one-fourth the height of the fin in front to one-half behind. Iris silvery behind, orange in front. Inside of mouth pale flesh color.

MEASUREMENTS.

	Ins.	lines.
Length from tip of snout to base of caudal	5	1
" " " anterior edge of orbit	0	4
" " " posterior "	1	1
" " " edge of operculum spine	1	11
" " " base of pectoral	2	1
" " " " ventral	2	8
" " " " dorsal	3	3
" " " " anal	4	3
" of upper caudal lobe	1	6
" " lower "	1	4
" " pectoral	1	4
Greatest height of dorsal	1	6
" " 1st dorsal spine	0	2
" " 2nd "	0	3
" " 3rd "	0	4
" " 4th "	1	3
" depth of body	3	7
" thickness of body	1	6
Length of supra-scapular spine	0	10
Space between eyes	0	7
Number of scales in 6 lines at middle of body, longitudinally ...	Six	
" " " " vertically ...	Three	

REFERENCE.—Shaw, Nat. Mis. and Gen. Zool. Fishes, vol. iv., t. 92.

I should have had no doubt, like Count Castlenau, that this very rare fish was identical with the unique specimen described about eighty years ago by Shaw under the name of *T. Australis*, were it not for the statements of Dr. Günther that this type specimen of Dr. Shaw, which is still in the British Museum, has 3 dorsal spines, 2 anal spines, 8 ventral keeled scales, and the height of the body not quite one-half the length from snout to *base* of caudal. I cannot say I feel satisfied that these remarks are correct, for Shaw's figure, in his "General Zoology—Fishes," vol. iv., t. 92, shows exactly the same relative height as our specimen, while Dr. Günther's proportion would stand for the *edge*, not *base*, of the

caudal in the present fish and Shaw's figure. Furthermore, Dr. Gray, examining the same specimen (as quoted in Low's Fishes of Madeira, p. 65), says, "There are only 3, *or* 4 *at most*, spines in front of dorsal," and if the small anterior dorsal spine which I count in the present fish was possibly, according to such an accurate observer, present in Shaw's type, it may have been overlooked by Dr. Günther, as it is little bigger than a scale, and applied so closely to the base of the second as to be easily overlooked. I count 12 scales of the large abdominal serration, but the anterior one between the bases of ventral fins is so obtusely keeled, or little compressed, that it might not be counted by some observers; and Shaw's figure seems to me to indicate 11 of these. Count Castlenau, in the description of the single specimen known to him (Proc. Lin. Soc. N. S. Wales, vol. iii, p. 364), counts 4 spines to the dorsal, but only 2 spines to the anal, and 10 scales to the serrated ventral keel (Mr. Macleay, Des. Cat. Aust. Fish, p. 146, says 9 to 11). His statement that there are no teeth on the palate bones is to me at present inexplicable. Mr. Macleay, in his excellent work above quoted, proposes the new name *T. Jacksoniensis* for the New South Wales specimen described by Count Castlenau as *T. Australis*, on account of those differences from Shaw's specimen as described by Dr. Günther; but for the reasons indicated I think it better to retain the old name, pending further examination of the type specimen, which might more fully warrant the establishment of a distinct species.

The tongue is so closely connected to the subjacent parts as almost to warrant the statement of some writers that it is absent; its surface is smooth.

The only specimen I have ever seen is that figured, which was presented to the National Museum by Mr. Jenkins, the fishmonger, of Swanston-street, who has contributed many rarities to the collection. Described by Shaw originally from a New South Wales specimen collected by White nearly a century ago, no second specimen has been seen since until the present one and that described by Count Castlenau. Cuvier and Valenciennes, in their great "Histoire Naturelle des Poissons," have had to construct a description from Shaw's figure, no example existing in the

Continental museums. The only other species of the genus, the *T. elongata* (Günth:), is easily distinguished by its more elongate slender form, smooth spines, and other characters.

The specimen in our Museum was caught in Hobson's Bay, 23rd May, 1884. Not figured of natural colors before.

EXPLANATION OF FIGURES.

PLATE 114.—Fig. 1, side view, natural size. Fig. 1*a*, front view of head, to show granulation and smooth spaces on top of head, natural size. Fig. 1*b*, interior of mouth, showing tongue, and bands of villiform teeth on jaws, palatine bones, and vomer, magnified two diameters. Fig. 1*c*, scales of abdominal keel, enlarged. Fig. 1*d*, anterior spines and branched rays of dorsal, to show their roughness, magnified two diameters. Fig. 1*e*, scale from lateral line, magnified three diameters. Fig. 1*f*, ditto, profile.

FREDERICK McCOY.

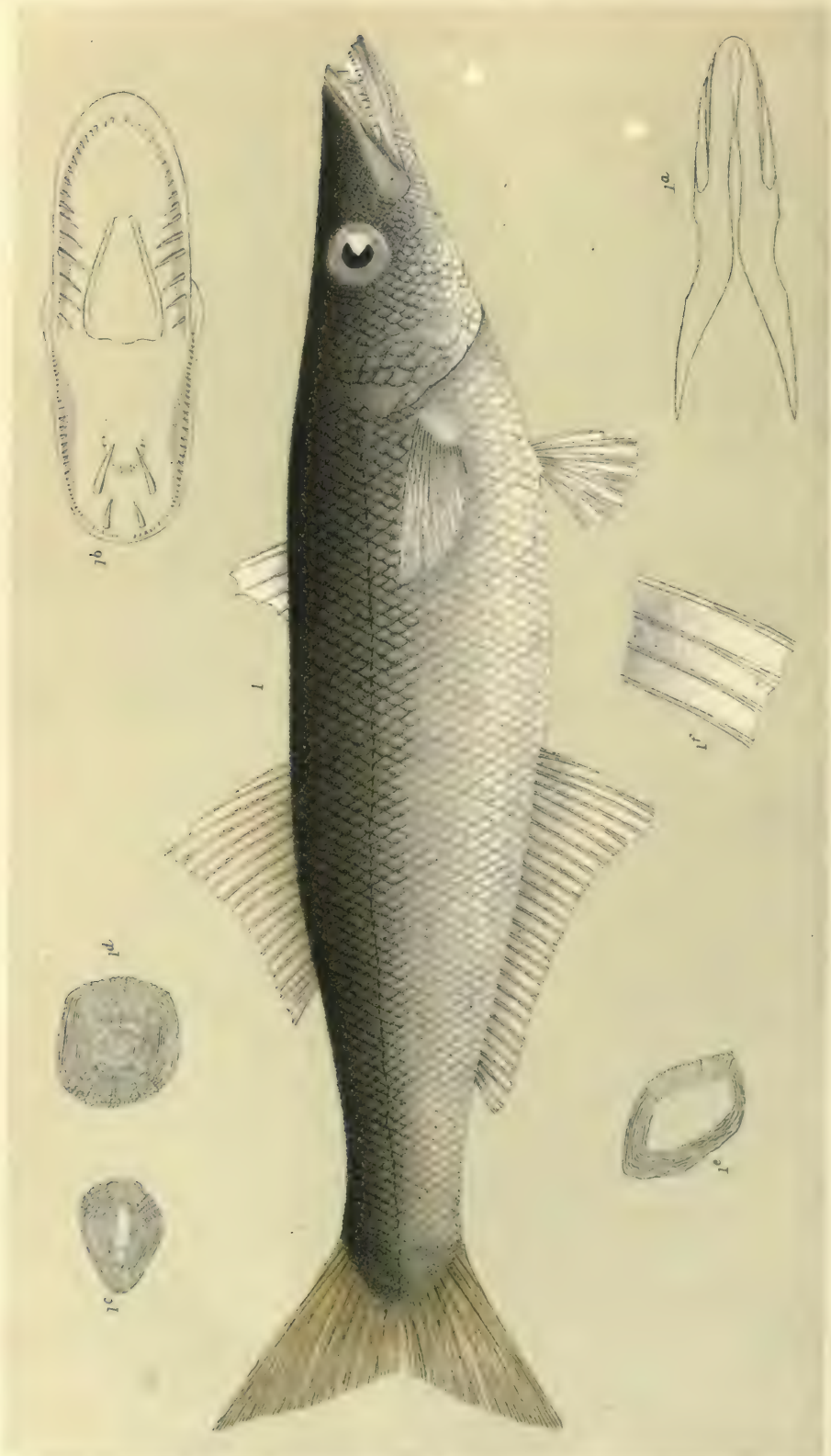


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PLATE 115.

LANIOPERCA MORDAX (GÜNTH.).

THE SKIP-JACK PIKE.

[Genus LANIOPERCA (GÜNTH.) = NEOSPHYRÆNA (CASTEL.) = DINOLESTES (KLUNZ.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Family Sphyrænidæ).

Gen. Char.—Body compressed, elongate, covered with deciduous cycloid scales of moderate size. Head sharp-pointed, covered with small scales; cleft of mouth wide, lower jaw projecting in front of upper one. Teeth in villiform bands on vomer, palatines, and jaws; an outer series of stronger, and one or two pairs of very large, laniary, teeth in front of upper jaw. Tongue smooth; eyes lateral, moderate; seven branchiostegal rays; pseudobranchiæ. Fins: Two dorsal, anterior one short, of 5 spines; anal with 2 spines; ventrals nearly under pectorals. No denticulation on plates of head; margins of opercular pieces thin and membranous. Australia.]

D. 5 + 2, 18; A. 3, 26; V. 1, 5; P. 16; C. 18; L.L. $67\frac{6}{11}$.

DESCRIPTION.—Form semiovate; head pointed, with a slightly concave profile; abdominal outline much more convex than the dorsal line. Height of body about 5 times in total length (without caudal); length of head, about $3\frac{1}{4}$ in the same; eye nearer to end of operculum than to end of snout; diameter of eye equal to interorbital space, about $\frac{2}{11}$ of length of head; maxillary not quite reaching vertical from front margin of eye. Preoperculum with a wide obtuse sinus in posterior edge; lower angle forming a rounded finely-serrated lobe. Teeth of lower jaw much larger than upper jaw, 4 or 5 posterior ones large, distant, laniary; outer row of upper jaw nearly equal, small, and about their length apart. Pectoral fin ovate, less than half the length of the head, of 16 rays; ventrals deltoidal, united below, slightly behind base of pectorals; 1st dorsal of 5 slender spines, about $1\frac{1}{2}$ its length in front of 2nd dorsal, which is high in front and of 2 simple and 18 branched rays; anal shaped like 2nd dorsal, of 3 simple and 26 branched rays; caudal forked, lower lobe largest, of 18 long rays and 7 or 8 short ones on upper and lower edges. Scales large, very deciduous, lateral line very prominent, nearly straight from upper edge of operculum to middle of tail; 67 along lateral line, 6 above and 11 below it. *Color:* Top of head, back, and sides dark purplish-grey, fading into whitish on throat and belly; first dorsal, pectoral, and ventrals nearly colorless; 2nd dorsal pale yellowish-olive; anal lighter; caudal yellowish-olive; 2nd dorsal and anal fins with rows of minute dark dots crossing the rays. Iris silvery white. *Measurements:* Total length of average specimen from tip of snout to tip of caudal fin, 1 ft. 7 ins. 6 lines. Proportional measurements (taking total length as 100): From tip of snout to middle of caudal, $\frac{96}{100}$; to base of caudal, $\frac{86}{100}$; to front edge of 1st dorsal, $\frac{35}{100}$; to front edge of 2nd dorsal, $\frac{49}{100}$; to front edge of anal, $\frac{52}{100}$; to base of pectoral, $\frac{26}{100}$; to front edge of ventrals, $\frac{29}{100}$; to front edge of orbit, $\frac{11}{100}$; to hind edge of orbit, $\frac{16}{100}$; to tip of operculum, $\frac{26}{100}$; length of pectoral, $\frac{12}{100}$; length of ventral, $\frac{8}{100}$; width of ventrals, $\frac{7}{100}$; length of anal, $\frac{23}{100}$; greatest depth at 2nd branched ray, $\frac{8}{100}$; length of 1st ray, $\frac{5}{100}$; length of last ray, $\frac{2}{100}$; length of 1st dorsal, $\frac{5}{100}$; greatest height at 2nd spine, $\frac{3\frac{1}{2}}{100}$; length of 2nd dorsal, $\frac{16\frac{1}{2}}{100}$; greatest height at 4th branched

ray, $\frac{10}{100}$; length of last ray, $\frac{11}{100}$; greatest depth between 1st and 2nd dorsal fins, $\frac{17}{100}$. Length of largest, anterior, upper tooth, 5 lines; length of upper anterior teeth, 2 lines; length of posterior lower teeth, 2 lines; length of teeth of anterior portion of lower jaw, $\frac{3}{4}$ line; those of edge of upper jaw, $\frac{1}{2}$ line. About middle of body 5 scales in one inch longitudinally, 3 vertically.

REFERENCE.—*Lanioperca mordax* (Günth.), Ann. and Mag. Nat. Hist. 1872, v. 10, p. 183 = *Dinolestes Mülleri* (Klunz.), Archiv. für Naturges, 1872, p. 29, t. 3 = *Neosphyræna multiradiata* (Cast.), Proc. Zool. Soc. Vic., v. 1, p. 96.

The *Laniopercæ* resemble the *Sphyrænæ* or Sea Pikes, but have much more numerous rays in the second dorsal and anal fins, and have teeth on the vomer, and bands of villiform teeth inside the large ones on jaws. The typical species was made the type of the genus *Dinolestes* by Klunzinger, and of *Neosphyræna* by Count Castlenau.

The Skip-jack Pike, as it is called by the fishermen, is not uncommon in the winter and spring months, and is easily distinguished from the Sea Pike, which it resembles generally and in color, by its shorter, thicker form and much longer anal and second dorsal fins. The color often seems a purplish-brown in the fish shops, when dead some time and most of the scales off; but when fresh is purplish slate-grey above, like the Pike.

Klunzinger's figure gives only four rays to the first dorsal fin, and the photograph published by the Rev. J. E. Tennison-Woods, in the "Fish and Fisheries of New South Wales," omits the first dorsal fin altogether, the error in both cases probably arising from the ease with which the spines are completely concealed when depressed into a deep slit or groove at the base of the fin.

EXPLANATION OF FIGURES.

PLATE 115.—Fig. 1, average specimen, half the natural size. Fig. 1*a*, under-view of head, to show the form of the isthmus, half natural size. Fig. 1*b*, inner view of mouth, natural size, showing the villiform bands of minute teeth, tapering at anterior and posterior ends on each jaw and on the front of the vomer, with the smooth tongue, and the row of larger outer teeth, becoming very large behind on the lower jaws, and the smaller, more uniform, outer row of teeth on the upper jaw, as well as the two pairs of great laniary teeth between the vomer and front of the mouth, and the few larger teeth on sides of back of vomer (the lower jaw is nearer the top of the plate). Fig. 1*c*, scales from lateral line, twice the natural size. Fig. 1*d*, scale from above the lateral line, twice the natural size. Fig. 1*e*, scale from below the lateral line, twice the natural size. Fig. 1*f*, portion of anal fin, natural size, to show the transverse streaks of minute dark dots.

FREDERICK MCCOY.

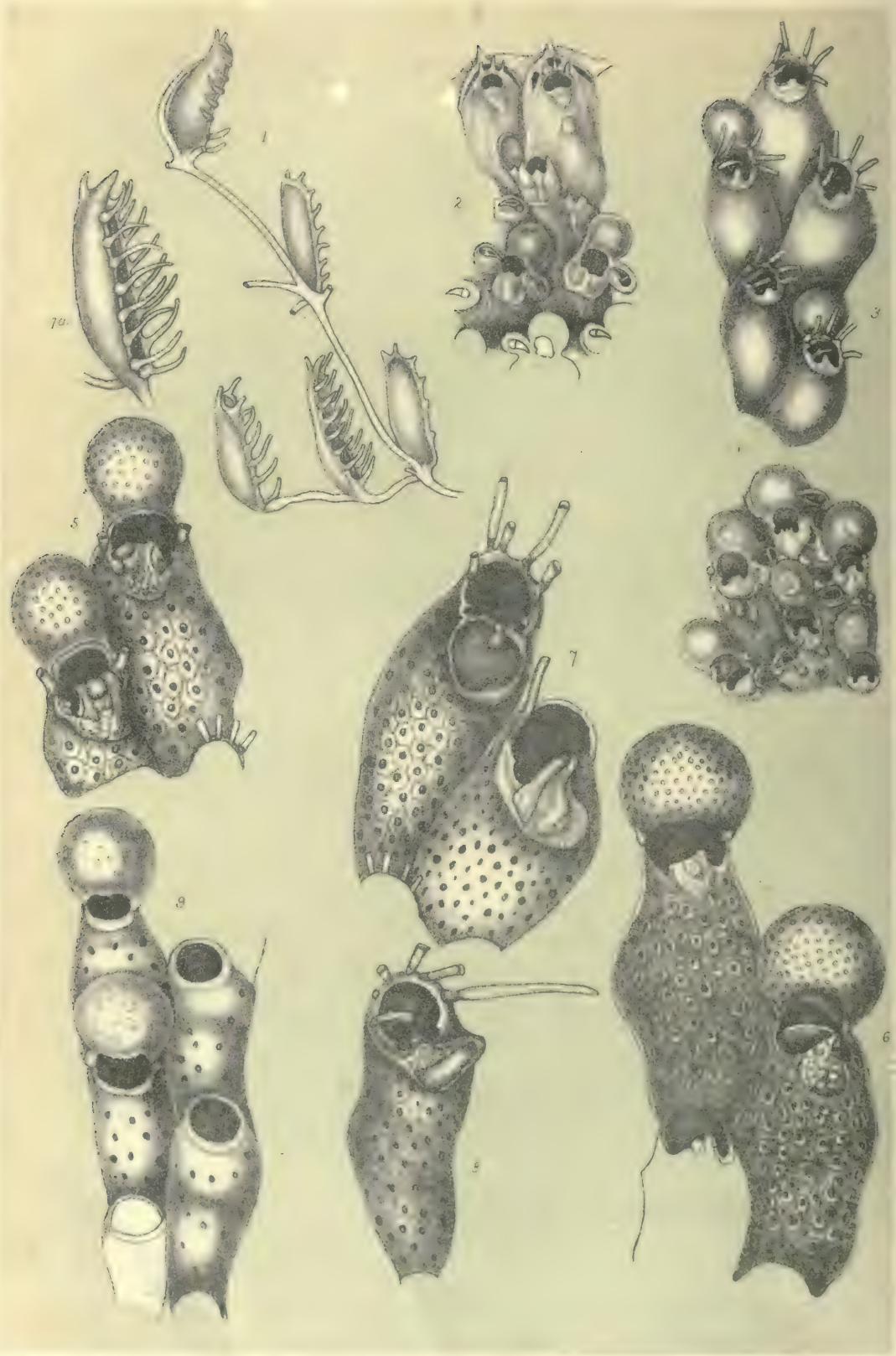
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PLATE 116, FIG. 1.

BEANIA MIRABILIS (JOHNSTON).

[Genus BEANIA (JOHNSTON). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Bicellariidæ.)

Gen. Char.—Zoarium creeping or loosely adnate. Zoœcia disjunct, connected by (usually) corneous tubes, erect or decumbent, ovate or boat-shaped, entirely open in front and filled in by a membrane. Usually one or two capitate pedunculate avicularia, perfect, aborted or altered in form.]

DESCRIPTION.—Zoarium sub-erect or decumbent. Zoœcia erect, connected by long, filiform tubes springing from their bases; each cell boat-shaped, with a thickened rim, two sharp spines superiorly and 7–10 sub-marginal, incurved spines or costæ on each side, the uppermost of which is stouter than the others.

REFERENCES.—Busk, Cat. Mar. Pol. Brit. Mus., Pt. i, p. 32, pl. xxiv., Figs. 4, 5; Hincks, Brit. Mar. Polyzoa, p. 96, pl. iv., Figs. 8–10.

Port Phillip Heads, Mr. J. B. Wilson.

This exceedingly beautiful and interesting species, for the discovery of which in Australia we are indebted to Mr. J. B. Wilson, differs in no respect from the well-known European form. The figured specimen occurs on a small piece of sea-weed. The zoœcia are boat-shaped, of a beautiful silvery appearance, and connected by long delicate tubes attached to their bases. The superior thicker spine seems to me to be evidently the homologue of the frequently-modified avicularium in the Diachoridan species.

EXPLANATION OF FIGURES.

PLATE 116.—Fig. 1, portion of zoarium, magnified. Fig. 1*a*, single cell, more highly magnified.

PLATE 116, FIGS. 2 AND 4.

MUCRONELLA TRICUSPIS (HINCKS).

[Genus MUCRONELLA (HINCKS). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Escharidæ.)

Gen. Char.—Zoarium crustaceous or erect and uni- or bi-laminate. Zoœcia with a suborbicular or semicircular orifice, the peristome of which is elevated into a more or less prominent inferior mucro.]

DESCRIPTION.—Zoarium encrusting. Zoœcia distinct, convex; primary mouth semicircular, with 3 or 4 long spines superiorly; secondary mouth with a pouch-like projection of the peristome below, the middle part forming a broad mucro and on each side produced into a sharp process. A raised avicularium on each side of the zoœcium below the mouth, with the long, pointed mandible directed outwards, and projecting

against the side of the mouth of the contiguous cell. Oœcia globular, smooth, occasionally with the margin thickened.

REFERENCES.—*Mucronella tricuspis*, Hincks, Ann. and Mag. Nat. Hist., Aug. 1881; *M. munita*, MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads; Portland, Mr. Maplestone.

Of this common species there are two varieties which I, at one time, considered as distinct species. The one, which may be taken as the type, forms, when young, thin glassy layers on Retepores, shells, &c. The oral spines are long and only seen on the marginal zoœcia. The whole surface of the zoœcia is smooth. In older specimens there is no difference except what is due to increased calcification. The peristome below forms a pouch-like projection, divided superiorly into three parts—a central broader and two lateral sharper projections. The central part is traversed by a shallow, vertical groove which is frequently, as in the figure, replaced by an elevated band or ridge. In the other variety, which I have described as *M. munita*, the surface of the zoœcia is sharply areolated round the margin, and the spines are much thicker and persistent. Even when highly calcified the areolation is frequently retained, although sometimes obliterated. In one beautifully perfect young, growing specimen the marginal spines are thick, with conspicuous chitinous articulations; and many of the zoœcia have a calcareous nodule on the front.

EXPLANATION OF FIGURES.

PLATE 116.—Fig. 2, portion of zoarium of normal form, showing the young marginal zoœcia and those fully formed, oœcia, and avicularia projecting on the sides of the mouths of contiguous zoœcia. Spines are seen on the marginal zoœcia, but not on the others. Fig. 4, small portion of the variety *munita*, in which, however, the marginal areolation has disappeared. The bases of the persistent spines are shown.

PLATE 116, FIG. 3.

MUCRONELLA LÆVIS (P. McG.).

DESCRIPTION.—Cells broadly ovate, arranged in linear series, separated by deep grooves, slightly convex, smooth; mouth rounded above, a broad denticle deep in the lower lip; peristome raised round the lower lip, produced in the centre into a prominent square or blunt mucro; six stiff, articulated spines on the upper margin. Oœcium small, globose, smooth, three spines showing on each side in front of it.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Sorrento, Mr. J. B. Wilson; Port Phillip Heads, on shells, &c.

Of a yellowish-brown color. Allied to *M. peachii*, from which it differs in the greater prominence of the mouth, the larger size of the mucro, the stouter spines (the articulations of which are usually darker colored), and the presence of three spines in front of the oœcium on either side. It is also closely allied to, and may prove to be identical with the *M. teres* described by Mr. Hincks from specimens dredged off Curtis Island.

EXPLANATION OF FIGURE.

PLATE 116.—Fig. 3, portion of specimen, magnified.

PLATE 116, FIGS. 5–8.

MUCRONELLA VULTUR (HINCKS).

DESCRIPTION.—Zoarium loosely attached or in hemeschara form. Cells large, distinct, surface cribriform, with numerous, slightly raised, circular foramina; mouth semicircular, with six spines on the upper margin; inside the lower lip a broad denticle, and on each side, separated by a rounded sinus, a sharp tooth; in front of the median denticle the peristome forms a large mucro, with a large avicularium on one side, the sharp point of the mandible of which is directed upwards. Occasionally a large avicularium, with a broad, blunt, tongue-shaped mandible on the front of a cell. Oœcium large, globular, closely and finely punctate, with, usually, a sharp point on each side of the opening.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., Aug. 1882.

Port Phillip Heads; Portland, Mr. Maplestone; Warrnambool, Mr. Watts.

In this large and handsome species the zoœcia are of great size, and the massive mucro, with its long, pointed, lateral avicularium, is very conspicuous. The front of the mucro is frequently elevated into a stout knob or process. The zoœcia posteriorly are quadrate, and have very frequently a large round pore, usually situated about the centre of the upper margin, probably indicating the attachment of a radical fibre. It is nearly allied to *M.* (*Lepralia*) *Ellerii* (McG.), of which it ought possibly to rank only as a variety. In *M. Ellerii* the primary mouth is of the same structure, but the central mucro is smaller (although frequently with the projecting process), and there are usually additional blunt processes at the sides of the mouth. The zoœcia, moreover, are

oblique ; and the oœcia are broader, the inferior angles not so sharply pointed, and there is a smooth space in front without any punctation.

EXPLANATION OF FIGURES.

PLATE 116.—Fig. 5, two mature zoœcia with oœcia, showing also the process on the mucro. Fig. 6, two cells from another specimen. Fig. 7, younger cells from another specimen, showing the growth of the mucro. Fig. 8, single marginal cell, showing the central and lateral denticles.

PLATE 116, FIG. 9.

CYCLICOPORA LONGIPORA (P. McG.).

[Genus CYCLICOPORA (HINCKS). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Escharidæ.)

Gen. Char.—Zoarium encrusting or loosely adnate. Zoœcia elongated ; mouth suborbicular, turned forwards, with a slightly-thickened margin. No avicularia. Oœcium prominent.]

DESCRIPTION.—Zoœcia much elongated, distinct, arranged in linear series, convex ; surface smooth and sparsely punctured ; mouth nearly circular, with the lower lip usually slightly straightened, margin thickened. Oœcium large, rounded, smooth.

REFERENCE.—*Lepralia longipora*, P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882 ; *Cyclicopora prælonga*, Hincks, Ann. and Mag. Nat. Hist., Oct. 1884.

Port Phillip Heads, mostly on calcareous nodules, common.

EXPLANATION OF FIGURE.

PLATE 116.—Fig. 9, portion of specimen, magnified.

The specimens and descriptions for the *Polyzoa* on this plate have been contributed by Mr. MacGillivray.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Polyzoa)

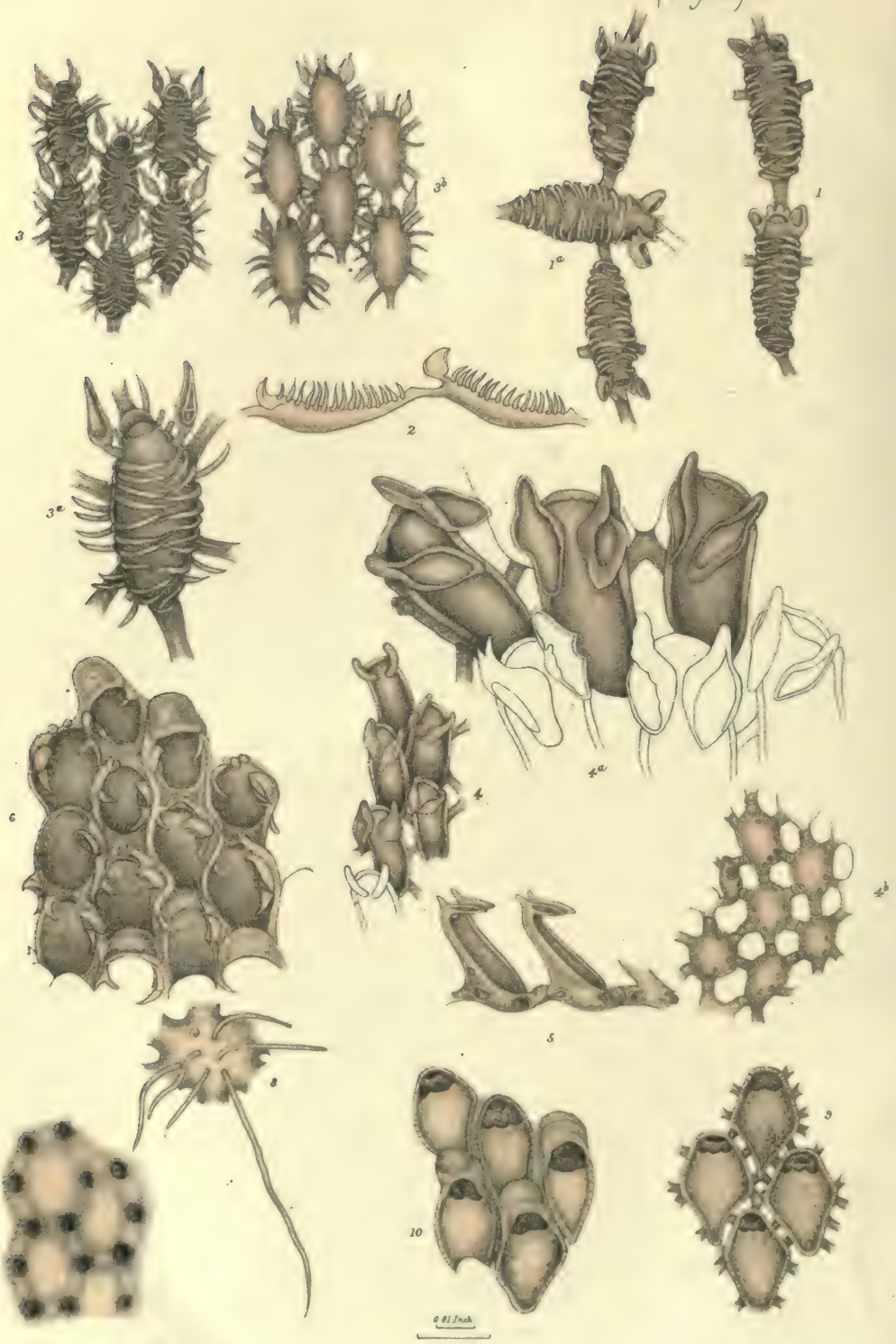

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PLATE 117, FIGS. 1 AND 2.

BEANIA DECUMBENS (P. McG.).

[Genus BEANIA (JOHNSTON). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Bicellariidæ.)

Gen. Char.—Zoarium creeping or loosely adnate. Zoœcia disjunct, connected by (usually) corneous tubes, erect or decumbent, ovate or boat-shaped, entirely open in front, and filled in by a membrane. Usually one or two capitate pedunculate avicularia, perfect, aborted or altered in form.]

DESCRIPTION.—Zoœcia much elongated; two or three short spines at the top; 14–16 long spines on each side, arching over the front of the cell and those of opposite sides interdigitating; at each upper angle a small capitate avicularium; connecting tubes springing from the extremities or sides, so that the cells are entirely decumbent.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1881.

Port Phillip Heads; first found by Mr. J. Bracebridge Wilson. Spreads in long, irregular lines over calcareous nodules. The connecting tubes are very short, and the zoœcia are arranged end to end, the branches, however, originating from the sides of the zoœcia. In many zoœcia there are one or two radical tubes from the sides, fixing them to the body on which they grow.

I have elsewhere given reasons for including most of the species of Diachoris in the present genus. The zoœcium in such a species as *D. spinigera*, as pointed out by Hincks (Polyzoa, p. 66), is identical in structure with that of a typical Beania. The number of the connecting tubes, the seemingly constant junction of each cell with six others, and, especially, the presence of capitate avicularia, constituted the reason for separating Diachoris; but Hincks has described a species, *D. intermedia*, in which the connecting tubes are four, and the symmetrical pattern is lost; and in Heller's *D. hirtissima* and the allied *B. conferta* (McG.) there are no avicularia. The character of the genus Beania, as now defined, depends on the structure of the cell, the margins being raised and front entirely open or membranous, their disjunction and connection with each other by tubes, and the presence of one or two perfect or modified capitate avicularia at or towards the oral end of the cell.

The systematic position of the genus is somewhat doubtful, but on the whole I agree with Mr. Hincks in referring it to

the Bicellariidæ. It is also closely related to the Membraniporæ through the very interesting *B. radicifera*, in which the original disjunction of the cells is shown by the short, thick, calcareous connection seen behind, and the avicularia, although sessile, are evidently a modification of the capitate form.

EXPLANATION OF FIGURES.

PLATE 117.—Fig. 1, two zoœcia of a series arranged end to end. Fig. 1*a*, single zoœcium with the first zoœcia of two branches springing from the sides. Fig. 2, outline of side view, to show the position of the attachment of the connecting tubes.

PLATE 117, FIG. 3.

BEANIA COSTATA (BUSK SP.).

DESCRIPTION.—Zoarium adnate or free; zoœcia connected with six others by corneous tubes; boat-shaped, rounded at either end; 4–6 spines above the mouth, and about 10 or 12 long incurved spines on each side of the aperture bending over the front, and those of opposite sides interdigitating; posterior surface of cells smooth; a capitate avicularium on each side opposite the mouth, usually directed upwards.

REFERENCE.—*Diachoris costata*, Busk, *Challenger* Polyzoa, p. 60, xxiv. f. 4.

Port Phillip Heads.

This species is allied to the *D. spinigera*, from which, however, it may readily be distinguished. The zoœcia are much smaller, the marginal spines more numerous and longer, and the avicularia are smaller, narrower, and more elongated.

EXPLANATION OF FIGURES.

PLATE 117.—Fig. 3, group of zoœcia, magnified. Fig. 3*a*, single zoœcium, more highly magnified; the outward direction of some of the marginal spines is owing to the irregular contraction of the sides of the cell in the dried specimen. Fig. 3*b*, back view of portion of same specimen.

PLATE 117, FIGS. 4 AND 5.

BEANIA CROTALI (BUSK SP.).

DESCRIPTION.—Zoarium loosely adnate or suberect; zoœcia erect, quadrate, each joined to six others by corneous tubes; from each upper angle a large lanceolate process (a modified avicularium) is directed downwards and inwards; posterior surface with several perforations at the base and on the sides.

REFERENCE.—*Diachoris Crotali*, Busk, Cat. Mar. Pol. Brit. Mus., pt. 1, p. 54, t. lxvi., figs. 1 and 2.

Port Phillip Heads; Portland, Mr. Maplestone.

The zoarium is partly free or adnate, and very loosely connected with the object on which it rests. The zoœcia are nearly erect, oblong. Each is connected with six others by tubes springing from the bases (not the sides and anterior extremity) of the zoœcia, the tubes thus forming a horizontal network from which the zoœcia are directed upwards. At each upper angle of the zoœcia there is articulated a lanceolate leaf-like process, the upper and narrower end of which forms a rounded knob. This process is hollowed on one surface, and has a prominent ridge on the other. There is no appearance of mandible, but there can be no doubt of its being a modified avicularium. At the base of the zoœcium, when viewed posteriorly, several rounded markings or openings are usually seen near the edge, mostly to one side, and they occasionally occur also on the sides of the erect part.

EXPLANATION OF FIGURES.

PLATE 117.—Fig. 4, anterior view of portion of a specimen. Fig. 4*a*, portion of the same, more highly magnified. Fig. 4*b*, posterior view of same. Fig. 5, side view of two zoœcia.

PLATE 117, FIGS. 6 TO 8.

BEANIA RADICIFERA (HINCKS SP.).

DESCRIPTION.—Zoarium attached by numerous radical tubes springing from the backs of the zoœcia; zoœcia large; aperture entirely membranous or slightly filled in below by a thin calcareous plate; two very short spines or tubercles above the mouth, and a long, incurved, blunt or occasionally furcate, rigid spine on one side, a short distance below the mouth; on the opposite side a large, sessile avicularium rising from a distinct broad base. Oœcia large, rounded, granular and pitted. Posteriorly, the zoœcia distinct, but each united by short calcareous tubes with six others, the spaces between the tubes appearing as round deep depressions.

REFERENCE.—*Membranipora radicifera*, Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, on mud and sponges.

This is in many respects a most interesting form, marking, as it does, the transition from Beania (including Diachoris) to Membranipora. The zoœcia with the slight filling in inferiorly are Membraniporidan; but, although they are united in front, posteriorly they present the characteristic arrangement of Diachoris, the rounded openings seen being the spaces between the connecting tubes of the adjacent cells, which, instead of being long and chitinous, are here short and calcareous. The avicularium is also

transitional. It is not capitate, but has a broad calcareous basis, clearly representing the pedicle of the ordinary capitate form. The mode of attachment is peculiar, the zoarium being fixed by numerous radical tubes springing from the backs of the cells.

EXPLANATION OF FIGURES.

PLATE 117.—Fig. 6, front view of portion of specimen. Fig. 7, back view, showing connection of each zoœcium with six others by short, thick, calcareous tubes. Fig. 8, single zoœcium from another specimen, showing a few radical fibres.

PLATE 117, FIG. 9.

AMPHIBLESTRUM PATELLARIUM (MOLL SP.).

DESCRIPTION.—Zoœcia slightly separated and connected by short tubes, oval and lozenge-shaped; margins raised, crenulated; lower two-thirds filled in by a minutely granular calcareous expansion; aperture nearly semicircular, occasionally somewhat trifoliate. Oœcia rounded, smooth, with a thickened rim below.

REFERENCES.—*Mollia patellaria*, Smitt, Flor. Bryozoa, Pt. ii., p. 12, fig. 72 = *Diachoris patellaria*, Waters, Ann. and Mag. Nat. Hist., Feb. 1879 = *Membranipora patellaria*, P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1881.

Port Phillip Heads.

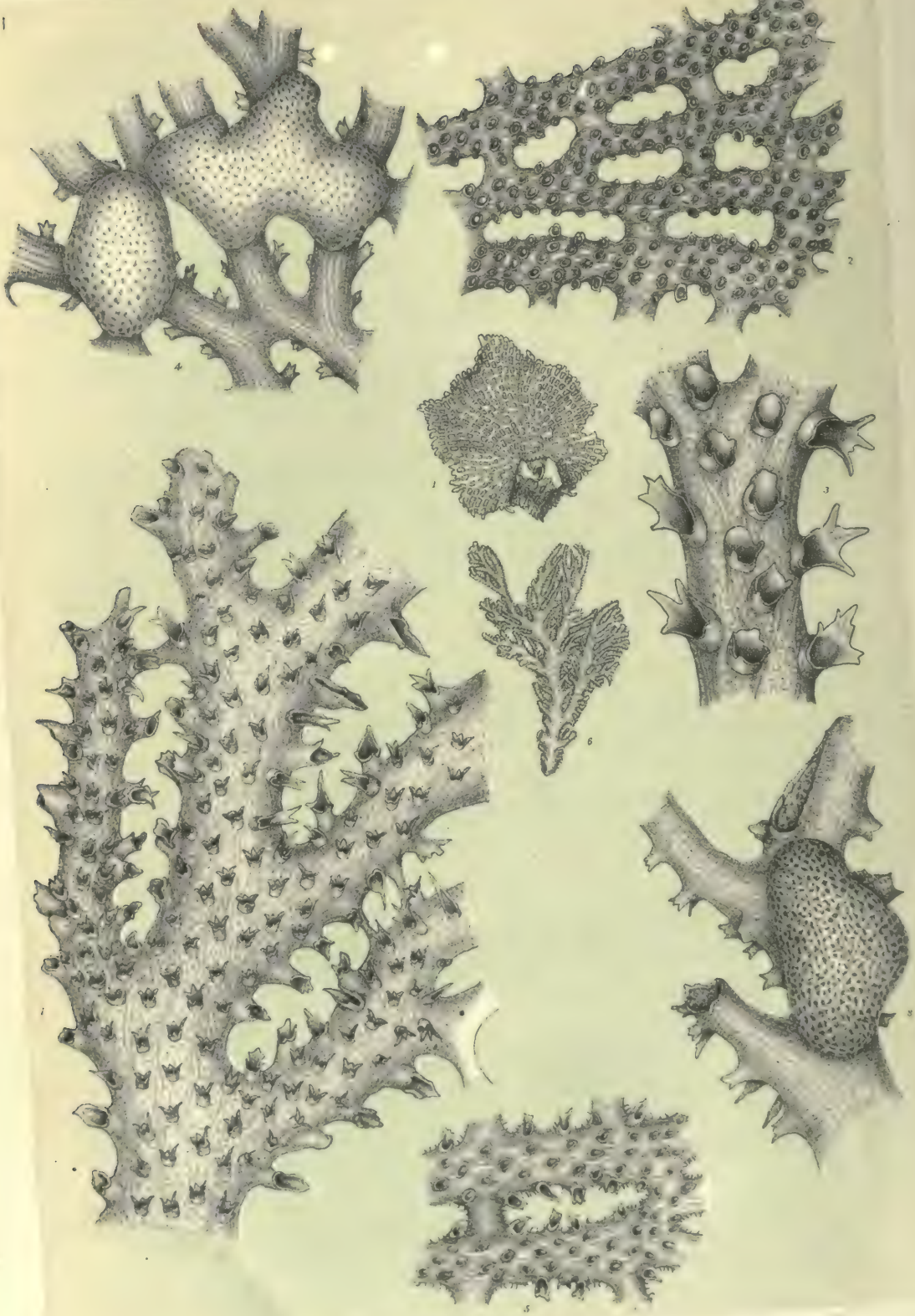
This species agrees with Beania and Diachoris in nothing but the disjunction of the cells; otherwise it is undoubtedly an *Amphiblestrum*, allied to *A. Rossellii.* It agrees perfectly with the form described by Waters, from the Bay of Naples, as *Diachoris patellaria* var. *multijuncta.* The cells are only slightly separated, and are sometimes so close that the connecting tubes cannot be distinguished. Each cell is connected with the adjacent ones by usually about twelve tubes. In the typical form, as figured by Smitt and Waters, the connecting tubes are much fewer. These naturalists consider Heller's *D. simplex* as the same species, which they refer to Moll's *Eschara patellaria.* I have not seen Moll's work, but Heller's figure certainly looks very different. No avicularia have been seen.

EXPLANATION OF FIGURES.

PLATE 117. — Fig. 9, group of zoœcia, magnified. Fig. 10, portion of another specimen, showing oœcia.

I am indebted for the specimens and descriptions of the Polyzoa on this plate to Mr. MacGillivray.

FREDERICK MCCOY.



J. Ripper del. et lith.

Prof. M.ᶜ Coy direx.ᵗ

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PLATE 118, FIGS. 1 TO 5.

HORNERA FOLIACEA (P. McG.).

[Genus HORNERA (LAMX.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cyclostomata. Family Idmoneidæ.)

Gen. Char.—Zoarium branched, branches distinct, anastomosing or connected by transverse bars. Zoœcia distinct, opening irregularly on one side of the branches. Oœcia dorsal or anterior.]

DESCRIPTION.—Zoarium rising from a discoid base, forming a foliaceous expansion, composed of sub-parallel branches dichotomously divided and connected by transverse bars forming oblong fenestræ; anterior surface divided into elongated, more or less rhomboidal, spaces by the approximation, at intervals, of slightly elevated longitudinal ridges; zoœcia opening in these spaces, exserted, the peristome produced and lacerated especially on the expanded outer lip; posterior surface longitudinally sulcate, the elevations between the sulci transversely marked by shallow grooves. Oœcia very large, bulging, extending usually over several branches, deeply and closely pitted.

REFERENCE.—*Hornera foliacea*, P. H. MacGillivray, Tr. Roy. Soc. Vict. = *Retihornera foliacea*, Busk, Brit. Mus. Cat., Marine Polyzoa, Part iii., p. 19, pl. xiii., figs. 1 and 2, pl. xix.

Port Phillip Heads; Portland, Mr. Maplestone; Western Port and Sealers' Cove, Baron von Mueller.

This beautiful and common species rises from a discoid base, spreads usually at first in a flabelliform manner, but ultimately becomes more or less convoluted, and frequently attains a size of two inches. The fenestræ are oblong, varying considerably in size according to age, sometimes narrower than the branches, sometimes as wide or even wider. The zoœcia are exserted in perfect specimens, with the peristome lacerated; in those at the margins of the branches the outer lip is much expanded, forming a laciniated lip with usually two or three teeth. There are seldom more than two or three rows of zoœcia in a branch, and their occurrence on the cross-bars is very infrequent. The surface of the branches is faintly granular and traversed by longitudinal, slightly elevated ridges, the approximation of which, at intervals, forms elongated, irregular, somewhat rhomboidal spaces in which the orifices of the cells are situated. The posterior surface is longitudinally sulcate, the intermediate elevations being marked by close transverse furrows. The depth of the posterior sulci, the distinctness of the

anterior ridges, and the prominence of the cell-mouths, of course, vary much with age. In some specimens numerous, small, sharp-pointed spines project from the edges of the fenestræ. These, however, are usually absent, even in perfect specimens. The oœcia are very large and prominent. They are seldom confined to one branch, but usually extend over several, generally bulging in the direction of the axis of each branch involved.

The genus *Retihornera* has been proposed by Kirchenpaur and adopted by Busk for the fenestrate species of *Hornera*. Such a species as *H. robusta* (McG.) shows the transition, and I cannot see any sufficient reason for dividing the old genus.

EXPLANATION OF FIGURES.

PLATE 118.—Fig. 1, specimen, natural size. Fig. 2, portion of the front of a specimen, magnified. Fig. 3, portion of another specimen, more highly magnified, to show the expanded, lacerated outer lip of the peristome of the zoœcia. Fig. 4, portion of the back of a specimen, showing two oœcia. Fig. 5, part of a specimen, with small spines on the edges of the fenestræ.

PLATE 118, FIGS. 6 TO 8.

HORNERA ROBUSTA (P. McG.).

DESCRIPTION.—Zoarium composed of one or more thick, flattened stems, from which lateral branches extend on either side, these lateral branches frequently anastomosing with each other and with those from adjacent stems; zoœcia arranged in numerous longitudinal rows, separated by raised ridges; mouth in the central zoœcia slightly exserted, in the lateral and those near the edge the peristome produced and irregularly dentate; posterior surface of zoarium longitudinally sulcate, the narrow intermediate ridges thickly punctate. Oœcium large, posterior, elongated in the direction of the branch, pitted.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1882.

Port Phillip Heads.

H. robusta attains a considerable size, a specimen dredged at Port Phillip Heads being two and a half inches by one and three-quarters. Its mode of growth is very characteristic. It originates from a single stem, usually subcylindrical, but sometimes broad or

indistinct. This divides usually into two, which again subdivide into several branches. From the main branches others spread on either side in a penniform manner, and these again give rise to smaller branches. These anastomose irregularly together, and the large branches from the neighbouring main stems frequently unite in the same manner. Some specimens consist only of a single stem with lateral branches. The resulting zoarium in those with several stems is more or less expanded and curled. The anastomoses are very irregular, and do not produce anything like the regular fenestrate arrangement seen in *Retihornera foliacea*. They seem to be frequently caused by the accidental contact of the peristomes of zoœcia in contiguous branches.

EXPLANATION OF FIGURES.

PLATE 118.—Fig. 6, specimen, natural size. Fig. 7, portion of a specimen, showing the anterior surface and the mode of formation of the anastomoses, magnified. Fig. 8, small portion of the back of another specimen, showing an oœcium.

Mr. MacGillivray has kindly contributed the specimens and descriptions of these species of *Retihornera* and *Hornera*.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Insects)

F. Wild, del. et lith. Govt. Printing Office

PLATE 119.

PHANEROPTERA VALIDA (WALK.).

THE SMALLER GREEN GUM-TREE GRASSHOPPER.

[Genus PHANEROPTERA (AUD. SERV.) (Sub-kingd. Articulata. Class Insecta. Order Orthoptera.* Section Saltatoria. Family Gryllidæ.)

Gen. Char.—Head small, narrow, oval, vertical; antennæ close together at base, longer than the body, setaceous, multiarticulate, first joint large, elongate, second spheroidal, capillary from the third joint; eyes small, prominent; no ocelli; labrum small, rounded; mandibles moderate, slender; maxilliary palpi with last joint twice as long as that of labial palpi, both truncated at tip. Legs long, slender; posterior femora very long, smooth; tibiæ long; spines of legs few and small; anterior tibiæ with a basal swelling, having a distinct oval cavity; tarsi 4-jointed, third joint narrow, bilobed. Elytra long, narrow, extending beyond the abdomen when at rest, and having large stridulating organ on inner base in the males; wings large, extending beyond the elytra. Prothorax short, flat or concave above, posterior edge sometimes raised; presternum smooth; mesosternum and metasternum concave, with raised lateral borders. Abdomen narrow; subanal plate of male bifurcate at tip, the two branches extending beyond the abdomen; two upper appendages long, setaceous, pubescent, those of the male a little arched upwards, and much larger than in the female; ovipositor very short, arched upwards from base, rounded at tip; valves flat, smooth above.

Sub-genus, *Phaneroptera* proper: Prothorax oblong, nearly parallel-sided and flat above, keeled at sides where deflected; legs and thighs nearly smooth.]

DESCRIPTION.—*Male:* Head brown, with green tinge; eyes very prominent, greenish-brown; antennæ very slender, pale brown; prothorax with a flat or slightly concave, oblong disc, sides bent down at right angles with a strong, straight, pale-yellowish keel on each side at the flexure; rest of the surface pea-green; anterior margin slightly concave, posterior edge convex. Presternum narrow, sulcate along middle, meso- and meta- sternum broader, slightly convex with raised lateral edges, deeply bilobed behind. Upper abdominal appendages long, slightly curved upwards; lower pair very short. Legs very long, slender; femora and tibiæ with few very minute spines, proximal half of hind femora moderately thickened; anterior pair of tibiæ dilated at base for oval drum cavity; all the legs pale brown, except thick part of hind femora, which are green on outer side. Tegmina, or anterior wings, narrow, about 2 lines shorter than posterior wings when at rest; larger areolets irregular, not distinctly marked; pea-green, except the large triangular part of inner base carrying the iridescent, transparent, stridulating spots, which are pale brown. Hind wings colorless, with pale pink and green iridescent reflection; a triangular, opaque, pea-green spot, 2 lines long, on anterior half of apex (which opaque green portion projects beyond the tegmina when at rest); abdomen brown above, green below; tibiæ, tarsi, distal half of hind thighs and palpi, pale brown; angle at sides of thorax, continued by inner or posterior veins of tegmina, when at rest, pale yellowish. Expanse of tegmina, 3 ins. 1 line; length of body, 1 in. Proportional measurements: Length of lower wings, 1 in. 6 lines, taken as unity; length of anterior wings, or tegmina, $\frac{100}{100}$; width of tegmina, $\frac{3}{100}$; length of prothorax, $\frac{16}{100}$; width of prothorax, $\frac{12}{100}$; length of abdomen, $\frac{40}{100}$; length of antennæ, $\frac{99}{100}$; hind femora, $\frac{60}{100}$; hind tibiæ, $\frac{65}{100}$. *Female:* General structure

* Although the name *Dermaptera* has some claims to priority for this Order, I have used *Orthoptera*, as employed by so many writers upon the group.

and color like male, except inner bases of tegmina, which are green, and finely reticulated like the rest. Length of tegmina, 1 in. 7 lines; length of body, 1 in. 1 line.

REFERENCE.—Cat. Derm. Salt., Pt. 2, p. 352.

The *Phaneropteræ* are the most elegantly slender of all the *Gryllidæ*, not only the small head and narrow body, but the narrowness of the anterior pair of wings (or tegmina, or elytra) aiding this characteristic appearance. The distance the hind wings project behind the tips of the tegmina when at rest, and the great length of the abdominal appendages of the male, are also peculiarities. The subanal plate of the male is sometimes double, in other species only bifurcate at tip; it is usually curved upwards. The shortness of the ovipositors of the female separates the *Phaneropteræ* at a glance from *Locustidæ*.

Like all the *Phaneropteræ*, the posterior wings when folded extend like a tail beyond the ends of the elytra or anterior wings when at rest, the exposed tips being usually colored like the elytra and of the same consistence, differing in these respects from the transparent membranous rest of the wing.

This species is common on young gum trees near Melbourne, the tint of which it so closely agrees with that it is by no means easy to detect the individuals loudly shirring or chirping on all sides of the observer.

It has not been figured before.

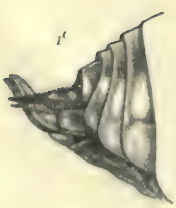
EXPLANATION OF FIGURES.

PLATE 119.—Fig. 1, male, natural size, in flying position. Fig. 1*a*, front view of head, magnified 3 diameters, showing absence of ocelli and form of front. Fig. 1*b*, labrum, or upper lip, showing its simple rounded edge, magnified 5 diameters. Fig. 1*c*, one of the strong cutting mandibles, magnified 5 diameters. Fig. 1*d*, one of the slender maxillæ, showing the hood over the serrated terminal joint and the maxillary palpi. Fig. 1*e*, labium, or under lip, showing its terminations and palpi, magnified 5 diameters. Fig. 1*f*, head and thorax viewed from above, magnified 3 diameters, showing the flat oblong disc, with the rectangularly-deflected sides. Fig. 1*g*, hind leg, magnified 2 diameters. Fig. 1*h*, anterior leg, showing swelling and drum cavity in base of tibia. Fig. 1*i*, tarsus viewed from below, magnified 3 diameters, to show the bilobed third joint. Fig. 1*k*, ditto, viewed from the side. Fig. 1*l*, sternum, to show the bilobed middle and hinder pieces, magnified 3 diameters. Fig. 1*m*, anal plate and appendages of end of abdomen of male, magnified 3 diameters. Fig. 1*n*, elytra, magnified two diameters, showing the neuration and large, clear stridulating organs at base. Fig. 2, female, viewed in profile, with the wings at rest, to show the projection of the wings behind the tips of the elytra, and the extension of both far behind the end of the abdomen. Fig. 2*a*, elytra, or tegmina, magnified 2 diameters, to contrast the neuration with that of the male, and to show the absence in the female of the transparent stridulating spaces at base. Fig. 2*b*, side view of plates of ovipositor and appendages at end of abdomen of female, magnified 3 diameters. Fig. 3, another specimen, in the walking position, seen from above, to show the overlapping of the left elytron.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Insects)



D. Wild. del. et lith.

Prof. McCoy direx.

Steam Litho. Govt. Printing Office

PLATE 120.

PHANEROPTERA (EPHIPPITYTHA) TRIGINTIDUO-GUTTATA (SERV.).

THE THIRTY-TWO SPOTTED GRASSHOPPER.

[Genus PHANEROPTERA (AUD. SERV.). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Gryllidæ.)

Gen. Char. — Head small, narrow, oval, vertical; antennæ close together at base, longer than the body, setaceous, multiarticulate; 1st joint large, elongate; 2nd spheroidal; capillary from the 3rd joint. Eyes small, prominent; no ocelli; labrum small, rounded; mandible moderate, slender; maxillary palpi with last joint twice as long as that of labial palpi, both truncated at tip. Legs long, slender; posterior femora very long, smooth; tibiæ long; spines of legs few and small; anterior tibiæ with a basal swelling, having a distinct oval cavity; tarsi 4-jointed, 3rd joint narrow, bilobed. Elytra long, narrow, extending beyond the abdomen when at rest, and having large stridulating organ on inner base in the males; wings large, extending beyond the elytra. Prothorax short, flat or concave above, posterior edge sometimes raised; presternum smooth; mesosternum and metasternum concave, with raised lateral borders. Abdomen narrow; subanal plate of male bifurcate at tip, the two branches extending beyond the abdomen; two upper appendages long, setaceous, pubescent, those of the male a little arched upwards and much larger than in the female; ovipositor very short, arched upwards from base, rouned at tip; valves flat, smooth above.

(Sub-genus Ephippitytha) (Serville) — Prothorax saddle-shaped, hollowed transversely, narrow and convex in front above, abruptly widening into a rounded dilated portion raised behind. Thighs and legs strongly spinous. Front with one tubercle.]

DESCRIPTION.—*Female:* Body yellow ochre, glossy; top of head blackish-brown; a rusty yellow spot under each eye. Frontal tubercle small, conical; point not reaching front of basal joint of antennæ. Prothorax saddle-shaped, hollowed on the deflected sides; upper surface contracted in front, widening abruptly behind; obliquely inclined upwards from the anterior to the posterior margin, with a median, triangular, reddish-brown spot; sides green, bent down, long, rounded; posterior portion brown, elevated, flat, rounded at the base of the elytra; sides of this plate with a black, polished, semilunate spot, wider in front. Elytra rather opaque, extending nearly an inch beyond the end of the abdomen, dull yellowish-green; anterior border wide, sinuous, narrowed towards the tip, which is rounded and of a duller color; the reticulate neuration of this margin coarse, irregular; each elytron with 8 to 10 oblong black spots in a longitudinal line on a paler streak, touching the posterior or inner margin of great marginal vein; 8 to 13 other similar spots forming an irregularly placed row on the inner margin of the elytra. Stridulating organ opaque, with reticulate neuration like that of anterior margin; hind wings transparent, with slightly-opaque green tips. Legs green, with transverse brown spots; hind thighs with 2 rows of moderate spines below; hind tarsi with 2 rows of moderately large spines above, 2 anterior pairs of legs, nearly smooth; 2 hinder joints of sternum green, with the deflected edges yellow. Base of anterior tibiæ swollen, with a large, oval, talc-like, glossy plate covering the cavity on both the outer and inner sides. Antennæ slender, setaceous, of very numerous, indistinct, cylindrical joints beyond the basal and 2nd joints, which are enlarged, the basal joint slightly exceeding the frontal tubercle in length. Length of body, 1 in. 4 lines; length of each of the tegmina, 2 ins. 1 line; greatest width of same, 5 lines; length of

hind wing, 2 ins. 2 lines; greatest width of same, 1 in.; length of antennæ, 1 in. 8 lines; length of hind thigh, 1 in. 4 lines; length of hind tibia, 1 in. 4 lines; length of hind tarsi, 2 lines; length of ovipositor, 2 lines. *Male:* Coloring as in female. Length from frontal tubercle to end of anal plate, 1 in. 1 line; length of tegmina, 1 in. 11 lines; greatest width of same, 6 lines; length of hinder wings, 2 ins. 1 line; greatest width of same, 10 lines; length of antennæ, 2 ins. 10 lines; length of hind thigh, 1 in. 2 lines; length of hind tibia, 1 in. 4 lines; length of hind tarsi, 3 lines. Anal plate compressed, upturned, bifid at extremity, half its length beyond end of abdomen. Two upper appendages of end of abdomen conical, 1½ lines long; length of anal plate, 2 lines.

Reference.—Aud. Serville, Hist. Nat. des Insect. Orthopt., p. 422 = *E. maculata*, Evans, Trans. Ent. Soc., v. iv., p. 303, t. 21, fig. *f. c.*

The black spots not only vary in number on the usual part of the elytra, but some have a few small ones on the anterior part of the elytra, and one near the green tip of the wing, as shown in our figures of two varieties, differing in those respects. It is one of the rarest of our Grasshoppers, one of the two examples in the Museum having been found in May 1876 at Emu Plains, near Benalla, by Mr. A. F. Bradshaw, to whom we are indebted for it. Not figured of the colors of life before.

Explanation of Figures.

Plate 120.—Fig. 1, female in flying position, natural size. Fig. 1*a*, top of head and disc of thorax, to show the saddle-shaped, narrow, keeled, anterior portion and wide flattened posterior part of disc, magnified 3 diameters. Fig. 1*b*, sternum, magnified 3 diameters. Fig. 1*c*, side view of end of abdomen, showing ovipositor and appendages, magnified 3 diameters. Fig. 1*d*, the same, viewed from above. Fig. 2, male, flying, natural size, of variety, showing small spots on anterior margin of elytra, and one larger spot near tip of each hind wing.

Frederick McCoy.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XIII.

BY

FREDERICK McCOY, F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER, ETC., ETC., ETC.

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PREFACE.

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This thirteenth Decade illustrates in the first plate, No. 121, the Bearded Lizard, or Jew Lizard of colonists, one of the most widely distributed of the Australian Sauria, although not found, or very rarely, in the cool, southern parts of the Colony; good figures of the adult of which have not been previously published.

The second plate, No. 122, illustrates one of the rare and fragile Ribbon-fishes, found near Portland on our western shores, thrown up from deep waters, and so liable to break in pieces, that figures from the life are always of interest and value as supplying some imperfections in previously figured specimens.

The third plate represents a new species (*Chironectes bifurcatus*), not figured before, of those curious fish called Toad-fishes, having the power and habit of walking about amongst the sea-weeds on their pectoral fins, the basal portions of which are lengthened, so as to assume the function and appearance of legs.

The fourth plate represents the beautiful coloring of life, for the first time, in one of the sections of the so-called Leather-jackets (*Monacanthus Browni*), having a projecting set of bristly spines about the size and shape of a tooth-brush on each side of the base of the tail.

The fifth plate gives the natural colors, for the first time, of another Leather-jacket, the most common on our shores, the *M. hippocrepis.* These Leather-jackets are almost universally shunned by the natives and fishermen as extremely poisonous; while, in reality, they are excellent food for the table and perfectly wholesome.

The three following plates illustrate a further instalment of the magnificent collection of Polyzoa made by Mr. MacGillivray, who has presented the specimens to our National Museum and the descriptions to this work.

The next plate, No. 129, shows the males and curiously abnormal, apterous female of the most aberrant genus of the *Gryllidæ*, the *Acripeza.*

The last plate figures the male, female, and details, for the first time, of the largest of our carnivorous *Orthoptera*, the *Mantis latistylus.*

The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest, and of which good figures do not exist or are not easily accessible.

FREDERICK MCCOY.

13th September, 1886.

ZOOLOGY OF VICTORIA

(*Reptiles*)

D.r Wilson del. et lith.

Prof. M.c Coy direx.

Steam. Lithe Govt. Printing Office

PLATE 121.

GRAMMATOPHORA BARBATA (KAUP).

BEARDED LIZARD.

[Genus GRAMMATOPHORA* (KAUP). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Strobilosaura. Fam. Agamidæ.)

Gen. Char.—Body moderate, subtrigonal or slightly depressed in section. Head large, trigonal, depressed, obtusely pointed in front; sides flattened, and separated from the top by an angle; covered with small, irregular, unequal, keeled, scale-like plates. Nostrils lateral, under angle, a little behind tip of snout. Ear-drum large, rounded. Tongue short, flat, narrow, spongy, notched at tip. Teeth short, semi-oval, compressed, on edge of jaw-bone; 5 incisors in middle, and 2 canines on each side above; 4 incisors below. Throat not pouched, with a strong, transverse fold between its base and front of thorax. Scales of back imbricated, unequal. Femoral and preanal pores large, numerous. Tail long, conical, tapering, depressed at base, with keeled imbricated scales. Toes slender, the first four gradually increasing in length, the fifth a little shorter than the second; subdigital scales keeled very strongly. Australia.]

DESCRIPTION.—Body broad, depressed; head large, swollen at the sides behind. Nostrils halfway between tip of snout and anterior edge of orbit. Top of head nearly flat, with a distinct angular ridge from tip of snout over the eyebrow, separating it from the concave side to edge of lip; the space over the eyes only slightly convex. Ear-drum oval in young, subtrigonal in old, without denticles or lobes on edge. *Scales:* Smaller and more numerous scales of all parts of the surface rhomboidal, with a strong, longitudinal, median keel ending in a point on the hind edge, and with two or three indistinct, lateral keels; mixed with these are trihedral, thorn-like, spinose scales, two or three times larger at base than the others, and rising to a conical point in the middle, with radiating, wrinkled base; a longitudinal ridge of 4 or 5 large, compressed conical spines over each ear, connected by a transverse row of 8 or 10 rather smaller ones across the back of the head; a large, dense, beard-like group of very long, slender, pointed, spinous scales,

Head, natural size, to show form of beard.

* I continue to use this generic name instead of *Amphibolurus* for reason mentioned in note to Plate 111.

arched backwards, and extending along the sides of the parotoids behind the ear, not extending quite across the back of neck; along each side from over the shoulder is a row of very long, sharp, backward-arched spines, like those of the beard; back without median, longitudinal ridge, but with numerous conical spines, shorter than those of the flanks or beard, and more upright on the base, irregularly arranged in bands extending obliquely backwards and outwards; similar spinose scales form several irregular, transverse rows on basal portions of tail with rhomboidal scales, larger than the small ones of the back, each with a very strong median keel forming continuous longitudinal ridges; upper surface of arms and thighs rough, with large spinous scales; a transverse group of spinous scales over the shoulder; belly with smooth and more uniformly regular rhomboidal scales, less strongly keeled longitudinally. Legs and toes short; hind limb reaching to shoulder if drawn up. Femoral pores about 7 to 9 on each thigh, forming an irregular line continued from side to side by 8 to 10 preanal pores. Tail round, depressed at base, nearly twice as long as head and body. *Color:* Sordid brownish-grey above, with the transverse rows of spines lighter, forming narrow, irregular, transverse, indistinct lighter bands; tail crossed by a variable number of narrow, light bands, 1 or 2 scales wide, separated by darker spaces, 6 or 7 scales wide; arms and legs also with narrow, irregular, variable, lighter bands; a blackish spot on side of neck from behind ear; belly lighter and more uniform, with large, oval, lighter yellowish spots with dark brown, narrow, irregular, imperfect margins; claws yellow on sides, dark above; inside of mouth and tongue yellow; iris dark brown. Dimensions of moderate specimen:—Total length, 1 ft. 5½ ins.; length of head, 2 ins.; width of head, 2 ins. 3 lines; tip of snout to base of tail, 9 ins.; tip of snout to nostril, 5 lines; tip of snout to anterior edge of orbit, 9 lines; tip of snout to ear, 1 in. 9 lines; arm, 1 in. 4 lines; fore-arm, 1 in.; free part of longest toe, 8 lines; thigh, 1 in. 6 lines; leg, 1 in. 3 lines; free part of longest hind toe, 8 lines.

REFERENCE.—Kaup, Isis, 1827, p. 621; Gray, Zool. E. and T. Rept. t. 18, f. 1 (young).

This is commonly called the Jew Lizard by colonists, and is easily distinguished by the beard-like growth of long, slender spines round the throat and parotoids, the form of which below, in the adult, is shown in the woodcut, and the similar band along the sides, as well as by the absence of any median keel along the back. Some specimens have the throat black.

When irritated, it inflates the body to a considerably increased size, and hisses like a snake, exciting alarm; but rarely biting. The eggs are usually 8 or 10, connected by membrane in a row.

I observe great difference in the acuteness or flatness of the plates of the head and of the large thorn-like scales of the body in different specimens, and the relative size of the rostral and mental plates at tip of snout. The throat has very generally a broad, black, transverse band where the beard-like scales grow, but this is sometimes absent. A few specimens have the belly pale and

uniform in color, but this is very unusual. Young specimens, 5 or 6 inches long, have the top of the head over the eyes more convex than the adults, and the coloring much brighter, being rich brown above, with the transverse narrow pale bands much more distinct, about 7 of them on body, 15 on tail, 3 on thigh, and 1 or 2 on arm; the broad streak from the eye through the ear, and the continuation of it which forms the usual dark mark on side of neck very dark rich brown; the broad, transverse, V-shaped band on throat of an inky blackness. In these young the spinose beard is very much smaller, and there are two rows of large (5 or 6) rhombic spots lighter than the general brown of the back, the midline of which shows like a dark series of rhomboidal spots, approaching to the markings of *G. muricata*, from which the absence of any median dorsal keel and the other characters enumerated above easily distinguish it.

This species is rare near Melbourne, but becomes gradually more abundant in all the more northern warm localities up to the Murray boundary.

EXPLANATION OF FIGURES.

PLATE 121.—Fig. 1, side view of moderate specimen, natural size. Fig. 1*a*, under-side of thighs, to show the femoral pores. Fig. 1*b*, under-side of head, two-thirds natural size, to show the transverse fold and the under part of the beard. Fig. 1*c*, edge of jaw, with molar teeth enlarged. Fig. 2, a couple of the strings of eggs, natural size.

FREDERICK McCOY.

(Fishes)

L. Bartholomew del et lith. Prof. M.Coy, direct. Steam Jobbing Govt. Printing Office

PLATE 122.

TRACHYPTERUS TŒNIA (BLOCH).

THE SOUTHERN SILVER RIBBON-FISH.

[Genus TRACHYPTERUS (GOUAN). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Fam. Trachypteridæ.)

Gen. Char.—Body very long, tapering gradually from the head to the tail; excessively compressed laterally to a thin band; no scales; eyes large, lateral; muzzle truncated, protractile; mouth small. Teeth few, small, conical, on jaw and palatine bones; one large dorsal fin of delicate, simple rays (not jointed nor branched), extending from head to base of tail, with small, semi-detached anterior portion of few elongated rays; caudal not in line of body, inclined obliquely upwards and backwards, of long, slender, branched rays; no anal; pectoral very small, rounded; ventrals large, of 5 or 6 branched rays, nearly under base of pectoral. Bones of head, preoperculum, operculum, and suboperculum radiatingly ridged; few conical teeth on jaws and vomer, and a patch of smaller ones on each palatine bone; branchiostegal rays, 6; large pseudobranchiæ in a pouch of mucous membrane. Pyloric appendages very numerous. No swim-bladder. Surface silvery, with fine transverse granulations. Bones of skeleton and muscles soft and brittle. Deep sea.]

DESCRIPTION.—Greatest depth of body a little behind the head, and one-fourth more than length of head with jaws retracted, and is contained $5\frac{3}{4}$ times in the total length, excluding caudal fin. Six conical teeth in front of upper jaw, and 8 in lower one; 4 smaller on vomer, and 2 oblong patches of very small, numerous teeth on each palatine bone. Eye about one-fourth the length of head, a little behind the middle and close to upper margin. Interoperculum nearly as large as operculum, suboperculum small, triangular, all the bones of the head radiatingly ridged; gill-opening reaching to vertical under middle of eye. *Fins:* First 5 rays of dorsal more elongated than following rays of continuous dorsal, from which it is also separated by a marked space of membrane; hinder portion of dorsal of about 170 rays, rapidly increasing to its greatest depth at about the 20th ray, where its height equals about half the depth of the body; the rays rough and granular, with a small spinous tubercle at base of each; caudal having an upper portion of about 6 or 8 very long branching rays directed obliquely upwards and a little backwards; and a lower portion of 6 short rays directed backwards; pectorals very short, rounded, of about 10 rays; ventrals about equalling the depth of the body, of 5 to 7 branched rays, the first one with a row of spinular granules on front. Lateral line of a row of conical spines, stellate at base, extending from upper edge of operculum to join that of other side below and in front of caudal, where a spine marks the junction of the two lateral lines, with a point directed forwards and another hooked backwards; a double row of small tubercles along ventral edge. Vent a little in front of middle of length. *Color:* Whole surface bright silvery; greyish-lavender on nape and head, and with transverse grey lines corresponding with neural spines of vertebræ; 2 spots on top of head, an oblique band across eye, and 3 large, rounded spots above lateral line; the 1st about one-third the length from snout, the 2nd a little in front of middle, the 3rd spot about half way between second one and tail, nearly black; and one oval paler one near abdominal edge behind the vertical of 1st upper spot; belly and behind gill-opening faintly tinged with brown; rest of surface rendered finely granular by very fine, close, transverse lines extending obliquely downwards and backwards from the back; fins rosy-scarlet, membrane paler than the rays. *Measurements:* Length, 10 ins. 3 lines; head, 1 in. 10 lines when snout retracted, 2 ins. 3 lines when protruded; greatest depth of body, 2 ins.; diameter of orbit, 6 lines, 6 lines in advance of hind edge of operculum,

distance from snout varying with protrusion of jaws; greatest thickness of body, about 2 lines (figured specimen). Second specimen—Length, 1 ft. 4 ins. 6 lines; greatest depth of body, 2 ins. 6 lines; length of head (half protruded), 2 ins. 3 lines; height of middle of posterior dorsal, 1 in. 9 lines.

REFERENCE.— = (Bloch and Sch.), p. 480 = *T. falx* (Cuvier and Val.), Hist. Pois. v. 10, p. 333; = ? *T. iris* (Cuv. and Val.), id. p. 341, t. 297.

The fishes of this genus resemble silver ribands or bright sword-blades, from their narrow, tapering, greatly compressed bodies, and the glistening silver lustre of the nearly smooth, scaleless surface. They are less known than those perhaps of any other genus, on account not merely of their rarity, but from their inhabiting the profound depths of the ocean, whence they rarely emerge, and where they are not exposed to the rough motions of shallower waters, in which they are quickly battered to pieces. The whole structure is so frail, brittle, and delicate, and so easily and quickly decomposed, that it is extremely difficult for observers to describe them; and I feel convinced that several of the described species are really only differently observed individuals of one or two species. Thus the relative length of the rays of the anterior portion of the dorsal fin, the caudal fin, and the ventral fins in different individuals is due to the excessive delicacy and fragility of the rays—as fine as the finest hair, and as brittle as spun glass—so that the slightest touch in separating the rays to count them breaks them in pieces. I think also that the young are deeper and shorter in proportion than the old; and, consequently, the specific differences founded on the greater number of times the length of the head or the depth of the body are contained in the total length are not to be trusted for specific characters when the length of the specimens is different. I also believe the numbers of rays in the dorsal fin increase with the length of the body of the individual. I notice that Cuvier and other observers of actual specimens invariably describe the largest specimen as, proportionally, the longest and most slender, and with the length of head or depth of body forming the least proportion of the total length, while small specimens, an inch or two long, are more ovate, with the head and the depth going fewer times in the total length. I therefore think it very likely that the *T. Spinolæ* of Cuvier may be the young of his *T. falx*, and *T. iris*, and *T. tænia*, to which I refer our Victorian species. The smaller

specimen figured of the natural size on our plate (Fig. 2) is probably the young of the larger and more typical example (Fig. 1), the anterior portion of the dorsal of which latter, I have no doubt, has lost the greater part of the length shown in the young, merely from accidental causes, owing to its fragility. The greater number of rays in the continuous dorsal in the larger than in the smaller specimen, I believe, follows the general rule mentioned as probably holding good for these fishes, although not for those families and genera with fewer rays.

The first specimen which reached the Museum was presented by Mr. Hy. Dusting, from Portland, caught in April 1879. A second, from my excellent friend, Mr. Henry Butler, of Portland, who has contributed a great number of rare fish and other marine objects to the Museum, somewhat smaller but more perfect than the first, is the example figured, and both specimens agree exactly in coloring and other details.

The third specimen, also figured, is another of Mr. Butler's donations, and is much smaller—only 2 ins. 7 lines long, without caudal fin—but more perfect, especially in the long anterior part of the dorsal. In this specimen the depth is contained only $3\frac{1}{2}$ times in the total length, excluding caudal fin. This, I believe, like Cuvier's *T. Spinolæ*, to be the young of the proportionately longer, larger specimen ; although, in this case, unlike *T. Spinolæ*, the large, rounded, black spots are wanting.

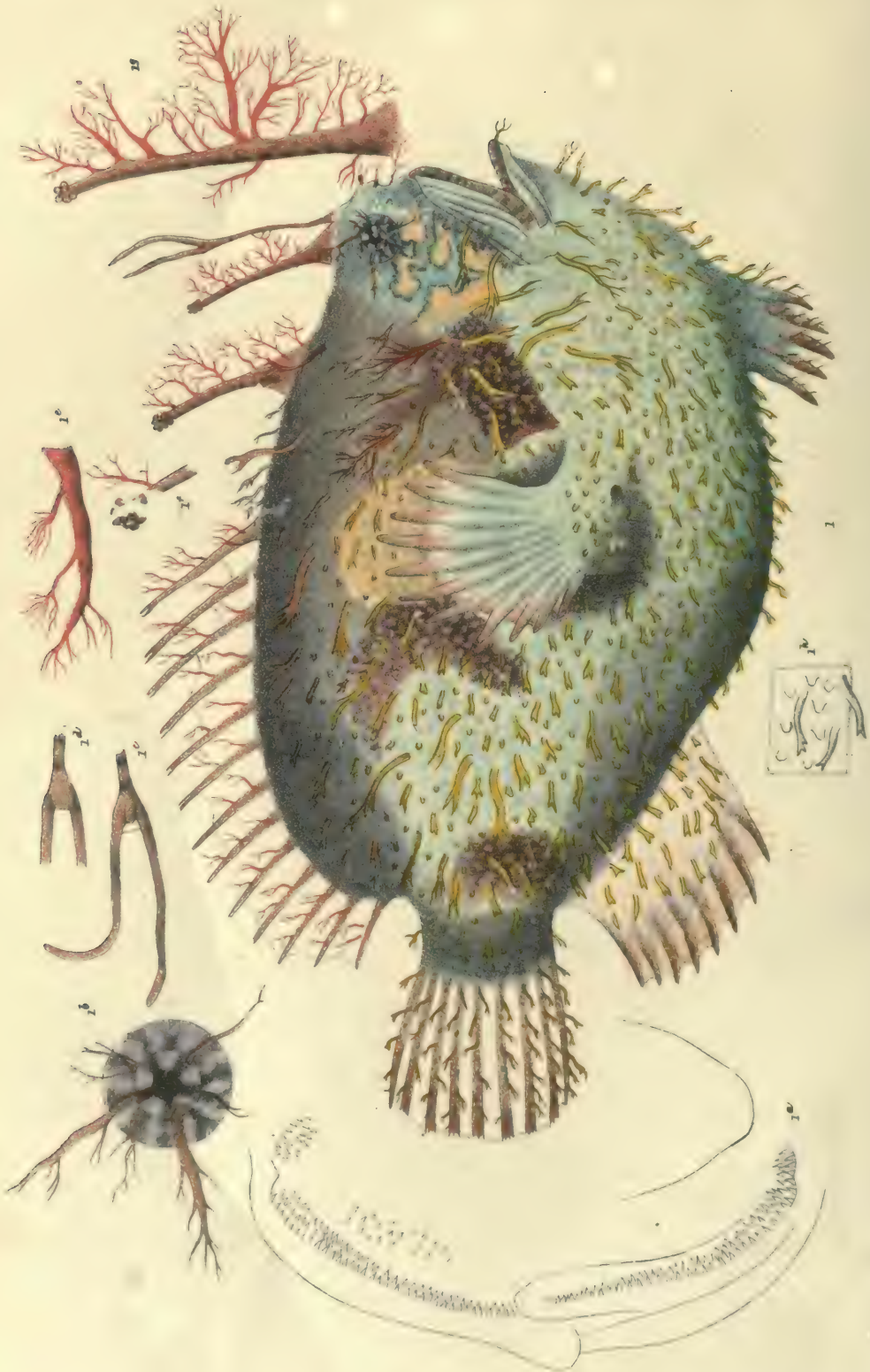
The curious silvery glitter of the surface seems slightly granular and disposed in very fine, oblique, transverse lines extending from above downwards and backwards from the dorsal to the ventral edge, and passing over the black blotches, from which it may be peeled off when decomposition sets in.

The mouth is so protractile that in taking the length of the head, compared with other parts, as a character, it is necessary to state whether it is extended or retracted.

EXPLANATION OF FIGURES.

PLATE 122.—Fig. 1, average specimen, natural size. Fig. 1*a*, front view of head, natural size. Fig. 1*b*, mouth showing the teeth on jaws, vomer, and palatine bones, magnified three diameters. Fig. 1*c*, section of body, to show compression. Fig. 1*d*, three spines from lateral line, magnified three diameters. Fig. 1*e*, one spine of lateral line, magnified five diameters, to show radiated base. Fig. 2, young specimen, natural size, probably of same species.

FREDERICK MCCOY.



A. Bartholomew del. et lith.

Prof. M.Coy direx.

Steam Litho Govt. Printing Office

PLATE 123.

CHIRONECTES BIFURCATUS (McCoy).

THE TWO-PRONGED TOAD-FISH.

[Genus CHIRONECTES (CUV.) > ANTENNARIUS* (COMM.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygia. Fam. Pediculati.)

Gen. Char.—Of moderate size, and compressed, ovate form; head moderate, compressed laterally. Three anterior dorsal rays, separate, and in front of dorsal fin, which has no other spines; the 1st ray forming a flexible tentacle over the snout; the 2nd and 3rd are stout spines. Mouth nearly vertical when closed. Jaws and palatine bones set with many rows of small, cardiform teeth. Tongue smooth. Aperture behind the four gills very small, oval, placed on pedicle of pectoral fin. Eyes near snout and top of head; opercular pieces covered by the skin; only half of anterior branchial arch with gills; no pseudo branchiæ. Stomach wide; no pyloric appendages; an air-bladder. Soft dorsal longer than anal fin. Pectorals pedunculated by elongation of carpal bones.]

DESCRIPTION.—Broad, ovate, moderately compressed; depth half the length to end of caudal, and twice the thickness; head compressed, profile descending obliquely from nape; mouth nearly vertical. First dorsal spine or filament with a slender, cylindrical stem, three-fourths the length of second spine, surmounted by a thickened portion divided into two thick, equal, cylindrical, tapering branches, and two short, flat, lateral flaps; second ray thick, bony, terminating in 5 blunt tubercles, and having numerous long, branching filaments on its anterior face; third spine like the second, but terminating in 8 or 10 soft tubercles, and with a slight, membranous extension from back of lower third of base, and with numerous, branching filaments from front face, far larger than those of second; dorsal fin of 13 thick soft rays (two last with one base), projecting about one-fourth beyond membrane, and with numerous, branching filaments from sides; caudal fin with 9 rays, set with branching filaments; anal fin with fleshy base and 8 or 7 rays set with few branching filaments; pectoral of 11 thick rays, set with very short, branching filaments on upper surface; ventrals with 5 thick rays, with few, very short, branched filaments on upper side; whole surface of body set with filaments bi- or tri-fid at end, 6 or 7 lines long on back, about 2 lines long on belly, longest on sides of head, throat, and lips; 2 very large and 3 smaller above the eye, and 2 smaller below it; skin smooth, or with blunt, conical tubercles between the filaments. *Color:* Whole body mottled with olive, pale yellow and light green, and with several large, irregular clouds of very dark brown, largest one over base of pectoral, next half way to base of tail, where a third conspicuous one usually appears; inside of mouth and tongue pale green, with opaque, pearly-white, cloudy spots; all the filaments orange; no spots on fin rays; eye with radiating bands of pale and dark green; anterior dorsal ray with the basal filament transversely banded with brown.

* As Commerson's name, *Antennarius*, was not published, but only written on his drawing, it is more according to rule to adopt the name *Chironectes*, published for fishes of the genus by Cuvier.

MEASUREMENTS.

	Ins.	lines.
Total length from snout to end of caudal	6	5
„ of head	1	6
Depth of head	1	7
Width of head	1	0
Length of stem of first ray	0	11
„ „ broad base of branches	0	2
„ „ each of two long branches	0	8
„ „ second ray	1	1
„ „ third ray	0	9
„ „ space between first and second rays	0	1½
„ „ „ second and third ray	0	11
„ „ „ third ray and first dorsal fin ray ...	1	0
„ from mouth to anterior base of pectoral	2	5
Depth of body	3	0
Thickness of body	1	5
Length of dorsal fin	2	4
Greatest height of dorsal fin	1	0
„ „ „ anal fin	1	3
Greatest depth	1	0
Length of caudal	1	0
Length of longest pectoral rays	1	2
Length of ventral fin	0	7
Greatest depth	0	7

Of three specimens before me the only difference is one spine more or less in the anal fin, and in the greater or less number of the large, brown blotches on the body; the two-pronged, first, long ray with the two, short, lateral flaps at bases of the two prongs at tip of basal filament, being alike in all.

There can be no doubt of the first filament bearing two long, thick, nearly equal branches or filaments at extremity, and this character allies it to *Antennarius histrio* and *A. tigris* only, of all those described by Dr. Günther and the *L. marmoratus* of Shaw, which latter need not be considered. From *C. histrio*, which it also resembles in the colored rays from the eye, it differs in the straight 2nd and 3rd dorsal rays, and their not being connected with skin of midline of back, except at base, and in the unspotted fins, and in the skin being smooth, instead of rough with small spines. *A. tigris* differs in having the 3rd dorsal ray connected to the soft dorsal by a wide skin, its rough spinular surface and the last ray of soft dorsal not reaching, if laid back, as far as base of caudal, and also in the spotted fins. None of the other species described by Cuvier, the French Voyagers, Richardson, Count Castelnau, Dr. Bleeker, or Dr. Günther, resemble this species at all, and it is the only species of the genus I have as yet met with on our shores.

These beautiful and curious fishes are found occasionally after strong south winds on the Brighton shore in summer in the shallow pools in the rocks. They are very soft and extensible, blowing themselves up like a balloon, as the *Diodon* does, when alarmed. The pedunculated pectoral and ventral fins look to the popular observer like fore feet or legs, and are used like them for moving amongst sea-weed, in which they crawl like toads; the very small gill-aperture, opening on the arm-pit of the pectoral fins, keeping the gills moist for so long a time that they seem almost amphibious in the habit of moving about out of the water between the tides.

This species has not been figured before.

EXPLANATION OF FIGURES.

PLATE 123.—Fig. 1, side view of average specimen, natural size. Fig. 1*a*, magnified view of mouth, to show rows of minute teeth on jaws and palatine bones. Fig. 1*b*, eye, magnified, to show radiating arrangement of color and form of tentacles. Fig. 1*c*, bifurcate anterior filament, magnified, showing the small, middle lobe on anterior aspect. Fig. 1*d*, ditto, seen from behind, to show the larger, posterior median lobe. Fig. 1*e*, tentacle, magnified. Fig. 1*f*, top of third dorsal spine, magnified, to show form of cluster of tubercles. Fig. 1*g*, second dorsal spine, magnified, to show tubercular tip and branching filaments. Fig. 1*h*, filaments and tubercules of ventral surface.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Fishes)

A. Bartholomew del. et lith. Prof. McCoy direxit. Steam. lithe Govt. Printing Office

PLATE 124.

MONACANTHUS BROWNI (RICH. SP.)

BROWN'S TOOTH-BRUSH LEATHER-JACKET.

[Genus MONACANTHUS (CUV.) + ALUTERIUS (CUV.) (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostea. Order Plectognathi. Fam. Sclerodermi.)

Gen. Char.—Body compressed, elevated in the middle; scales small, rhombic, distinct on inner surface of skin, obscured by minute spines roughening the outer surface; sides of tail with 4 or 6 hooked spines in 2 or 3 rows, smaller or absent in females. Lateral line absent or indistinct. *Teeth:* 6 broad, flat, sharp-edged incisors in outer row of each jaw, and 4 forming an inner row in upper jaw, alternating, one between the 1st and 2nd, and the other between the 2nd and 3rd, on each side of the outer row. *Fins:* First dorsal composed of one large thick rough bony spine, which may be fixed in erect position or lowered into a pit on back, over the eye; membrane very small, triangular at base, with or without a second small, rudimentary spine; soft dorsal and anal long and low, with simple unbranched rays; pectoral small, rounded; caudal rounded; ventrals replaced by a small spine, sometimes rudimentary or absent. Branchial slit in front of base of pectoral. No barbel to chin. Tropical and subtropical seas.]

DESCRIPTION.—Body sub-fusiform, rhombic, moderately compressed, profile nearly straight, very slightly convex, rising to a little behind the first dorsal at an angle of about 25 or 30 degrees. General proportion slender, the greatest height about one-third of the total length, including the caudal fin. Eye large, close to the frontal level. Branchial slit oblique, nearly equalling the diameter of the eye, lower end just above level of base of pectoral. First dorsal spine nearly straight, irregular, slightly less than half the length from its base to the snout, placed over the posterior third of the eye, quadrangular in section, the two anterior longitudinal ridges with about 13 large, slightly hooked spines, directed obliquely downwards forwards and outwards. Two posterior keels with much fewer and smaller spines, very irregular in size, shape, and direction, most of them being directed upwards, and a few outwards or downwards; a few irregular spinous tubercles on the sides between these rows. One very small ray in the membrane behind the large spine. Abdominal edge narrow over the long pelvic bone, the point of which is scarcely traceable, but is covered with a little plate having a few large spines at its angles, and beyond which the ventral outline rises abruptly to the anterior base of the anal fin. *Fins:* Pectoral semi-oval, rounded, of 13 rays. Second dorsal rising rapidly to the 7th and 8th rays, with an obtusely rounded curve, continuing thence with a straight edge and gradually diminishing height to the posterior end, of 33 simple rays. Anal rising rapidly to the 6th or 7th ray with a rounded anterior edge, thence nearly straight to the shorter rays of posterior end, composed of 32 simple rays. Caudal fin rounded, of 14 thick, doubly-branched rays, set with spinulose granules. Skin covered with small rhombic scales, each rising into a point having a broad radiated base, in the fresh state, on some parts of the body; the apex of the spine is capped with a granular cutaneous mushroom-like expansion. On the

midline of the body, from about the vertical from the anterior margin of the anal fin to a little beyond the line of its posterior termination, a tooth-brush-like cluster of very long, slender, bristle-shaped spines, 6 or 7 wide in the middle, and as high as the 2nd anal spine, stand out perpendicular to the sides of the body, some of them straight, and others with the tips bent. *Color:* Back and upper half of sides and head rich yellowish-bronze-green as ground color, with 7 or 8 irregular, longitudinal rows of short streaks and oval spots of sapphire-blue, and very numerous intermediate dots of dark brown; 2 or 3 narrow, olive streaks round the mouth; ground color of lower half of sides and belly pale opaline-blue, mottled and dotted with the yellowish-green and brown of back, but paler, and with paler, similar, irregular blue spots and short streaks; a long, oval, dull, saffron-yellow patch extends from over front of anal fin nearly to base of caudal, from the upper portion of which arises the "tooth-brush" set of spinose filaments of the same dull yellow mottled with brown; below this yellow patch to base of anal fin the ground color is opal-purple with small, irregular, brown spots; three long, narrow, brown streaks, about their own width apart, run along over the base of anal fin, the space between the lower pair sapphire-blue; caudal fin dull pale yellowish-olive with darker brownish rays; dorsal, anal, and pectoral fins with pale, almost colorless, yellowish membrane, and darker yellowish-olive rays; anterior dorsal spine blackish-olive; iris brown. *Measurements:* Total length from snout to end of caudal, 1 foot. Proportional measurements to total length as unity: Snout to anterior edge of orbit, $\frac{24}{100}$; greatest depth of body, $\frac{35}{100}$; greatest thickness behind head, $\frac{12}{100}$; diameter of eye, $\frac{7}{100}$; height of 1st dorsal spine, $\frac{10}{100}$; distance of base from edge of upper teeth, $\frac{25}{100}$; length of branchial slit, $\frac{4}{100}$; length of pectoral, $\frac{12}{100}$; length of 2nd dorsal, $\frac{30}{100}$; greatest height of ditto, $\frac{14}{100}$; from snout to anterior ray of ditto, $\frac{50}{100}$; from snout to anterior ray of anal, $\frac{51}{100}$; length of anal, $\frac{28}{100}$; greatest height of ditto, $\frac{12}{100}$; length of caudal, $\frac{15}{100}$; height of tooth-brush spines, $\frac{8}{100}$. Number of spines in space of 3 lines about middle of body, 5.

REFERENCE.—*Aleuterius Browni,* Rich. Voy. E. and T. Fish, p. 68 = *Monacanthus lineo-guttatus,* Hollard Monog. des Balist. Ann. des Sc. Nat., 1854, Zool. v. 2, p. 352.

Those species of *Monacanthus* having a brush-like cluster of slender, bristly, elongate spines on each side of hinder part of body and tail are called "Tooth-brush Leather-jackets," from these curious developments being about the size and shape of a coarse tooth-brush. These filaments are obviously a great prolongation of the minute spines of other parts of the body. This strange character is only fully developed in old males. In the present species the dorsal and anal fins are unusually high, and the spinose teeth on the anterior ridges of the first dorsal spine unusually large. The curious mushroom-like soft, fleshy, granulated tips to the skin spines in the fresh specimens shrink so as to expose the simple sharp points with their large stellated base, when dried.

Not very uncommon in Bass's Straits. The example on our plate was obtained in blasting the rocks at the Heads.

This species has not been figured of the natural colors before. It is reputed poisonous, but many of my friends have praised it highly as a table fish, and it is certainly quite wholesome.

Explanation of Figures.

Plate 124.—Fig. 1, side view, about two-thirds natural size. Fig. 1*a*, front view of mouth, showing the teeth, twice the natural size. Fig. 1*b*, anterior spine, side view, one and a half times the natural size, showing small second spine in membrane, behind base. Fig. 1*c*, ditto, viewed in front. Fig. 1*d*, section, three times the natural size. Fig. 1*e*, section across posterior part of body to show the projection of the "tooth-brush" spines. Fig. 1*f*, side view of ventral spine, three times the natural size. Fig. 1*g*, the same, viewed from below. Fig. 1*h*, scales of the middle of body, magnified four diameters. Fig. 1*i*, one of the scales, more highly magnified, showing the top of spine without skin. Fig. 1*k*, side view of one of the spines of skin, fifteen times larger than natural size. Fig. 1*l*, front view of spine without skin, magnified. Fig. 1*m*, top view of 1*k*. Fig. 1*n*, scales from side of tail, magnified four diameters.

Frederick McCoy.

A. Bartholomew del. et lith.

Prof. M'Coy direx.

Stevens' Lith. Govt. Printing Office

PLATE 125.

MONACANTHUS HIPPOCREPIS (QUOY AND GAIM. SP.).

THE HORSE-SHOE-MARKED LEATHER-JACKET.

[Genus MONACANTHUS (CUV.) + ALUTERIUS (CUV.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostei. Order Plectognathi. Fam. Sclerodermi.)

Gen. Char.—Body compressed, elevated in the middle. Scales small, rhombic, distinct on inner surface of skin, obscured by minute spines roughening the outer surface; sides of tail with 4 or 6 hooked spines in 2 or 3 rows, smaller or absent in females. Lateral line absent or indistinct. *Teeth:* 6 broad, flat, sharp-edged incisors in outer row of each jaw, and 4, forming an inner row, in upper jaw, alternating, one between the 1st and 2nd, and the other between the 2nd and 3rd, on each side of the outer row. *Fins:* First dorsal composed of one large, thick, rough, bony spine, which may be fixed in erect position or lowered into a pit on back, over the eye; membrane very small, triangular at base, with or without a second small, rudimentary spine. Soft dorsal and anal long and low, with simple unbranched rays. Pectoral small, rounded. Caudal rounded. Ventrals replaced by a small spine, sometimes rudimentary or absent. Branchial slit in front of base of pectoral. No barbel to chin. Tropical and sub-tropical seas.]

DESCRIPTION.—Body sub-fusiform, compressed, profile nearly straight, rising at an angle of about 30° from the longitudinal lateral midline to a little behind first dorsal, thence slightly concave to origin of second dorsal, the dorsal line beyond this being nearly straight to the base of the caudal. Greatest depth of body about one-third of the length, including the caudal fin. Eye large, close to the frontal level. Branchial slit oblique, nearly twice the length of the diameter of the eye; lower end a little below middle of base of pectoral. First dorsal spine straight, irregular, slightly less than half the length from its base to the snout, placed over the posterior third of the eye; section convex in front, angular, nearly flat behind; lateral edges with a row of about 20 very small spines, irregular in size, shape, and direction, some extending upwards, others downwards and outwards; anterior face covered with minute, rounded granules having a tendency to run into flexuous longitudinal lines, the two middle anterior rows much larger than the others, slightly spinose in some specimens towards the apex; second ray absent in most specimens. Ventral spine at end of pelvic ridge scarcely perceptible, covered with a very small, spinulose, oblong plate. Pectoral broad, rounded, of 13 rays. Second dorsal low, rising rapidly to the fifth ray, thence continuing with little diminution to near the end, of 35 simple rays. Anal about as high as the second dorsal, the first ray shorter than the succeeding ones, which diminish slightly till near the end, of 32 or 33 simple rays. Caudal fin sub-truncate, slightly convex, of 12 thick, doubly-branched rays, set with small spinulose granules. Skin with small rhombic scales, with fine granules, and a line of from 3 to 7 larger, thicker, sharp-pointed spines, inclined backwards on each; 4 very much larger, conical spines on each side of the base of the tail, inclining backwards in female, forwards in male. *Color:* Head, cheeks, and portion of back yellowish-olive, darkest on sides of head; belly lighter olive as far as anal fin; from tip of pectoral to about end of anal fin a broad, deep chrome-yellow, ovate patch, having a black horse-shoe-shaped mark

on its anterior half, enclosing an oblong dark grey patch; posterior part of back, belly, and base of tail dark grey; 3 bright ultramarine-blue stripes surround the mouth, with a dull yellow one behind each; 3 or 4 long, flexuous, narrow stripes of bright blue extend from the throat along the belly, the two lowest joining from one side to the other, one in front and one behind the vent, the next lower one at the base of the anal fin; the upper one continued in a loop at the base of the caudal, and extending thence a little below the dorsal margin, nearly to the base of the anterior dorsal spine, with a dull yellow streak below it on the middle of the back, and two rows of numerous blue spots above it, and 2 or 3 rows of dark-purplish spots below, between it and the middle yellow patch; 2 or 3 short blue streaks radiate from the eye in front. All the fins with nearly colorless membrane and sap-green rays, with a bluer tinge on the caudal; caudal fin with a broad semilunar black band from the upper to the lower angle; a narrower band along the upper and the lower edge, and a narrower band of black at the base. Iris bronze-yellow. *Measurements:* Total length from snout to end of caudal, 1 ft. 1 in. 6 lines. Proportional measurements to total length as unity: Snout to anterior end of orbit, $\frac{19}{100}$; greatest depth of body, $\frac{33}{100}$; greatest thickness behind head, $\frac{13}{100}$; diameter of eye, $\frac{4\frac{1}{2}}{100}$; height of 1st dorsal spine, $\frac{10}{100}$; distance of base from edge of upper teeth, $\frac{2\frac{5}{6}}{100}$; length of branchial slit, $\frac{8\frac{1}{2}}{100}$; length of pectoral, $\frac{7}{100}$; length of 2nd dorsal, $\frac{29}{100}$; greatest height of ditto, $\frac{7}{100}$; from snout to anterior ray of ditto, $\frac{42}{100}$; from snout to anterior ray of anal, $\frac{54}{100}$; length of anal, $\frac{23}{100}$; greatest height of anal, $\frac{7}{100}$; length of caudal, $\frac{10}{100}$. Number of scales in space of 3 lines about middle of body, 8.

REFERENCE.— = *Balistes hippocrepis*, Quoy and Gaim., Voy. Uran. Zool., p. 212; = *Aluterius variabilis*, Rich. Voy. E. and T. Fish, p. 67, t. 53, f. 1 to 7.

The "Leather-jackets," as the species of *Monacanthus* are popularly called, are numerous in Australia, and are remarkable for the varied character of the small roughnesses which cover the skin outside, obscuring the scales, which are, however, distinctly visible on the inner side; these roughnesses are sometimes pointed spines, or with variously bent or dilated tips. The spine of which the first dorsal fin is mainly composed, when raised is fixed in that position immovably by a short, thick, bony piece falling under a notch in its base; the spine cannot be lowered until this so-called trigger-bone is depressed. They all have a long pelvic bone forming the abdominal outline, and terminating in a more or less distinct point or spine in front of the anus, sometimes absent, and sometimes with a radiated or variously sculptured base. Those having the pelvic spine constitute the genus *Monacanthus* of Cuvier, and those without it his *Aluterius;* but nearly all subsequent writers agree in uniting those groups under the first name. The sides of the tail have generally 4 or 6 conspicuous arched spines directed backwards or forwards. These are smaller or absent in the females.

In old males Dr. Günther observed that these caudal spines are directed forwards, and I give woodcuts, of the natural size, to show examples of both of these directions from specimens otherwise similar. The stripes vary considerably in different individuals.

Upper figure with small spines on tail directed backwards; lower figure with much larger spines directed forwards. Both figures natural size.

This beautiful species, with its conspicuous horse-shoe-shaped black mark on the golden-yellow patch on each side, seems to have suggested the fountain Ἱπποκρήνη, near Mount Helicon, sacred to the Muses, produced by a stroke of Pegasus' hoof, to Messrs. Quoy and Gaimard in giving it the specific name. Like most of the other Leather-jackets, it is greatly infested with a large Isopodous crustacean, which burrows in the hinder part of the abdomen.

Not uncommon at the Heads. The specimen figured was got by blasting the Lightning Rock there. It has not been figured of the colors of life before. Like the other Leather-jackets, it is good for food, although reputed poisonous.

EXPLANATION OF FIGURES.

PLATE 125.—Fig. 1, side view of average specimen, about half natural size. Fig. 1*a*, side view of teeth, natural size. Fig. 1*b*, section at front of pectorals, half natural size. Fig. 1*c*, front view of spine, natural size. Fig. 1*d*, side view of same. Fig. 1*e*, side view of another specimen, five times the natural size. Fig. 1*f*, front view of same from upper half, to show the irregular direction of the lateral spines. Fig. 1*g*, transverse section of same spine. Fig. 1*h*, spines on scales, three times the natural size. Fig. 1*i*, side view of spines. Fig. 1*k*, one of caudal spines, magnified. Fig. 1*l*, another of ditto, magnified. Figs. 1*m* and 1*n*, two others, magnified. Fig. 1*o*, side view of 1*m*, magnified. Fig. 1*p*, pelvic spine with granules, magnified.

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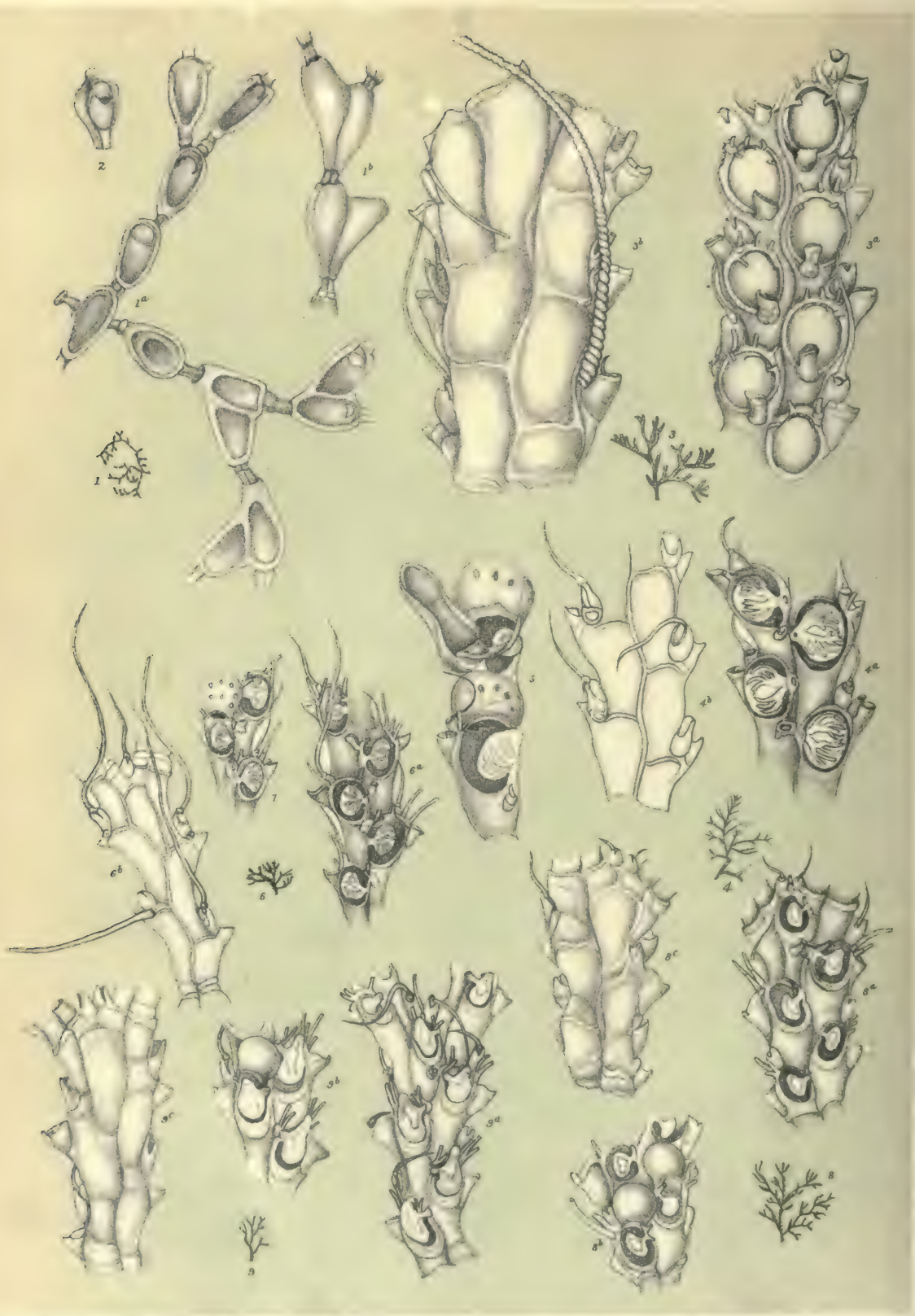

J. Ripper del. et lith.

Prof. M'Coy direct.

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PLATE 126, FIGS. 1–2.

MAPLESTONIA CIRRATA (McG.).

[Genus MAPLESTONIA (McG.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Cellulariidæ).

Gen. Char.—Zoarium consisting of series of single or geminate zoœcia, connected by distinct corneous tubes. Zoœcia with the front wholly occupied by a membranous area, or with the lower part filled in; imperforate behind. No avicularia or vibracula. Oœcium an inflation of the posterior part of a zoœcium.]

DESCRIPTION.—Occurs in minute purplish tufts, the branches consisting of series of single and geminate zoœcia, and curling inwards. In the single zoœcia the front is usually entirely membranous, the margins being thickened and bevelled inwards; in the geminate zoœcia the lower part is generally filled in by the cell wall; the posterior surface is imperforate, and mostly marked by faint transverse lines. The mode of branching is very irregular. In all cases of geminate zoœcia each zoœcium gives origin to the first of a series, but in some cases two branches spring from the summit of a single zoœcium, or they may originate from its sides. The oœcium is very peculiar; the ovicelligerous zoœcium is terminal, broad, very much enlarged posteriorly, with a wide spout-like opening above the upper margin of the aperture.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July 1884.

Portland, Mr. Maplestone; Warrnambool, Mr. Watts; Port Phillip Heads, Mr. J. B. Wilson.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 1, specimen, natural size. Fig. 1*a*, portion magnified, to show the anterior surface of the zoœcia and the mode of branching. Fig. 1*b*, small portion of the same, to show the posterior surface. Fig. 2, oœcium.

PLATE 126, FIG. 3.

SCRUPOCELLARIA CYCLOSTOMA (BUSK).

[Genus SCRUPOCELLARIA (VAN BENEDEN). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Cellulariidæ.)

Gen. Char.—Zoarium usually jointed. Zoœcia biserial, numerous in an internode; aperture large, rounded; each zoœcium with a sessile avicularium on the upper and outer angle, and, occasionally, another, smaller, on the front; and a sinus posteriorly lodging a vibracular cell. Oœcia superior, prominent. Radical tubes fixed to the base of the vibracular cells.]

DESCRIPTION.—Zoœcia usually about 7 in an internode, broad; aperture occupying three-fourths of the front, nearly elliptical, slightly narrowed downwards, with a narrow, clear, thickened margin, and destitute of scutum; a single or two contiguous spines at the upper and outer part, one at the inner and two above. Lateral avicularia of moderate size; on each zoœcium, immediately below the aperture, a considerable avicularium with the mandible opening upwards and forwards, on an elevated process. Vibracular cells large; vibracular setæ short and smooth. A single vibracular cell in the angle at a bifurcation. Radical tubes long

and thick, spirally annulated, especially at the commencement, but becoming smooth upwards.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 24, pl. xxviii., figs. 4, 5.

Port Phillip Heads; Portland, Mr. Maplestone.

Forms tufts about three-quarters of an inch high. It is readily distinguished by the width of the branches, the large uncovered aperture, and the anterior avicularium, which is situated on an elevation directed upwards and forwards, the mandible opening transversely upwards. The only species with which it can be confounded is *S. ferox* (Busk), in which the mandible of the anterior avicularium is very much larger.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 3, specimen, natural size. Fig. 3*a*, portion magnified, to show the anterior surface. Fig. 3*b*, dorsal view of the same.

PLATE 126, FIGS. 4–5.

SCRUPOCELLARIA OBTECTA (HASWELL).

DESCRIPTION.—Zoœcia 4–9 in an internode, broad; aperture large, nearly elliptical, with a very slightly thickened margin; a large scutum* of the same shape, and covering almost the whole aperture, with two groups of digitiform markings; a single stout spine at the upper and outer part. Lateral avicularian processes small; an anterior avicularium, of rather small size, below the aperture on a rigid elevation. Vibracular setæ short and smooth. A single vibracular cell at a bifurcation. Oœcium globular, perforated by round foramina. Radical tubes smooth.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., March 1883.

Port Phillip Heads; Mr. J. Bracebridge Wilson.

This seems to be a rare species, as I have not found it among my own dredgings. It is readily distinguished by its large size, and the very large scutum, which is marked by two groups of conspicuous digitiform channels between its layers. Hincks describes a spine also at the upper and inner angle, which does not exist in the specimen examined by me. He also states that the radical fibres are hooked.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 4, specimen, natural size. Fig. 4*a*, anterior view of portion of same, magnified. Fig. 4*b*, dorsal view. Fig. 5, zoœcia and oœcia from another specimen, which is much worn, except the oœcia, which are clear and distinct. This shows also an extraordinarily developed avicularium.

* This process, is in earlier descriptions, called the operculum, a term now generally restricted to the oral flap. Smitt named it the fornix, and has been followed in the *Challenger* Polyzoa by Busk, who, however, suggested the present appellation, which has been adopted by Hincks, and is used here as being the most appropriate.

PLATE 126, FIGS. 6–7.

SCRUPOCELLARIA CERVICORNIS (BUSK).

DESCRIPTION.—Zoarium small, branches narrow. Zoœcia 4–10 in an internode, elongated, wide above, narrowed below; aperture elliptical, occupying rather more than one-third of the front, margin slightly thickened; a somewhat reniform fornix, with a rather narrow peduncle, covering about half of the aperture, and marked with radiating canals obscurely arranged in two groups; a variable number of spines round the upper part; usually one, simple or branched, at the upper and inner part, two, jointed, at the outer, and one superiorly. Lateral avicularian processes large; anterior avicularia small, situated considerably below the aperture and close to the inner margin. Vibracular setæ very long, slender and smooth. Oœcia slightly contracted below, perforated by round foramina. Radical fibres smooth.

REFERENCE.—Busk, Cat. Mar. Pol. Brit. Mus., pt. i., p. 24, pl. lxii.

Port Phillip Heads.

Occurs in small glassy tufts on other Polyzoa. Busk figures and Hincks describes (Ann. and Mag. Nat. Hist., March 1883) the lateral avicularia as very small, while in my specimens they are of considerable size.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 6, specimen, natural size. Fig. 6*a*, anterior view of a portion, magnified. Fig. 6*b*, dorsal view of the same. Fig. 7, small portion of another specimen, to show the perforated oœcium.

PLATE 126, FIG. 8.

SCRUPOCELLARIA SCRUPEA (BUSK).

DESCRIPTION.—Zoœcia 5–12 in an internode, broad; aperture occupying nearly half of the anterior surface, with a thickened margin; a hammer-shaped scutum covering about half of the aperture, rounded below, and narrowed and slightly turned forwards above; a stout, occasionally bifurcate spine directed forwards at the base of the peduncle of the scutum, and usually about 3 from the upper and outer part. Lateral avicularian processes of moderate size or, occasionally, very large; anterior avicularia rare, small, on a somewhat columnar elevation, and with a very small mandible. Vibracular setæ short and slender; usually two vibracular cells in the angle of a bifurcation. Oœcia smooth, imperforate. Radical tubes smooth, ending in rosette-like expanded extremities.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 24, pl. xxi., figs. 1, 2.

Port Phillip Heads; Portland, Mr. Maplestone.

Forms small white tufts, half an inch or more in height. There can, I think, be no doubt that this is identical with the common European species, of which, however, the only specimens I have are rather imperfect.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 8, specimen, natural size. Fig. 8*a*, view of anterior surface, magnified. Fig. 8*b*, another portion of the same, showing two ovicells. Fig. 8*c*, dorsal surface.

PLATE 126, FIG. 9.

SCRUPOCELLARIA ORNITHORHYNCHUS (WYV. THOMSON).

DESCRIPTION.—Branches of zoarium slender. Zoœcia elongated, narrowed downwards; aperture elliptical, occupying rather less than half the front, with a thickened margin much wider below; scutum much projected forwards, extending the whole length of the aperture, somewhat pyriform, the upper extremity produced into a narrow point, and turned forwards; a bifurcate or double spine close to the base of the peduncle of the scutum, and 3 or 4 long, slender spines from the outer and upper part of the aperture. Lateral avicularian processes usually very large; anterior avicularia very small, situated on eminences below the apertures. Vibracular setæ short, slender, smooth. Two vibracular cells at a bifurcation. Oœcia smooth, imperforate.

REFERENCE.—Wyville Thomson, Dublin, Nat. Hist. Rev., July 1858, p. 144, pl. xii., fig. 2; Busk, *Challenger* Polyzoa, pt. i., p. 24, pl. xi., fig. 6.

Port Phillip Heads and elsewhere.

In some of my specimens it is difficult to discriminate between this and *S. scrupea*. The chief distinctions are in its smaller size, the more slender zoœcia, the extremely long scutum, which is much projected forwards, overlaps the whole length of the aperture, and has the upper extremity pointed and turned forwards. The arrangement of the spines is much the same in both, although in the present they are usually more slender and longer, and the inner one is almost always bifurcate or double. In both, the lateral avicularian process is of considerable size, and there are two vibracular cells in the angle at a bifurcation. The margin of the aperture is usually much more thickened below, and is occasionally slightly tubercular. Thomson describes the scutum as ending in a spine, and figures this as very long. There can, however, be no doubt that this is the species intended by him.

EXPLANATION OF FIGURES.

PLATE 126.—Fig. 9, specimen, natural size. Fig. 9*a*, anterior view, magnified; in this portion the branches at the bifurcation are continuous, not articulated. Fig. 9*b*, another portion of the same, showing oœcia. Fig. 9*c*, dorsal view.

I am indebted to Mr. MacGillivray for the specimens and descriptions of the Polyzoa on this plate.

FREDERICK MCCOY.

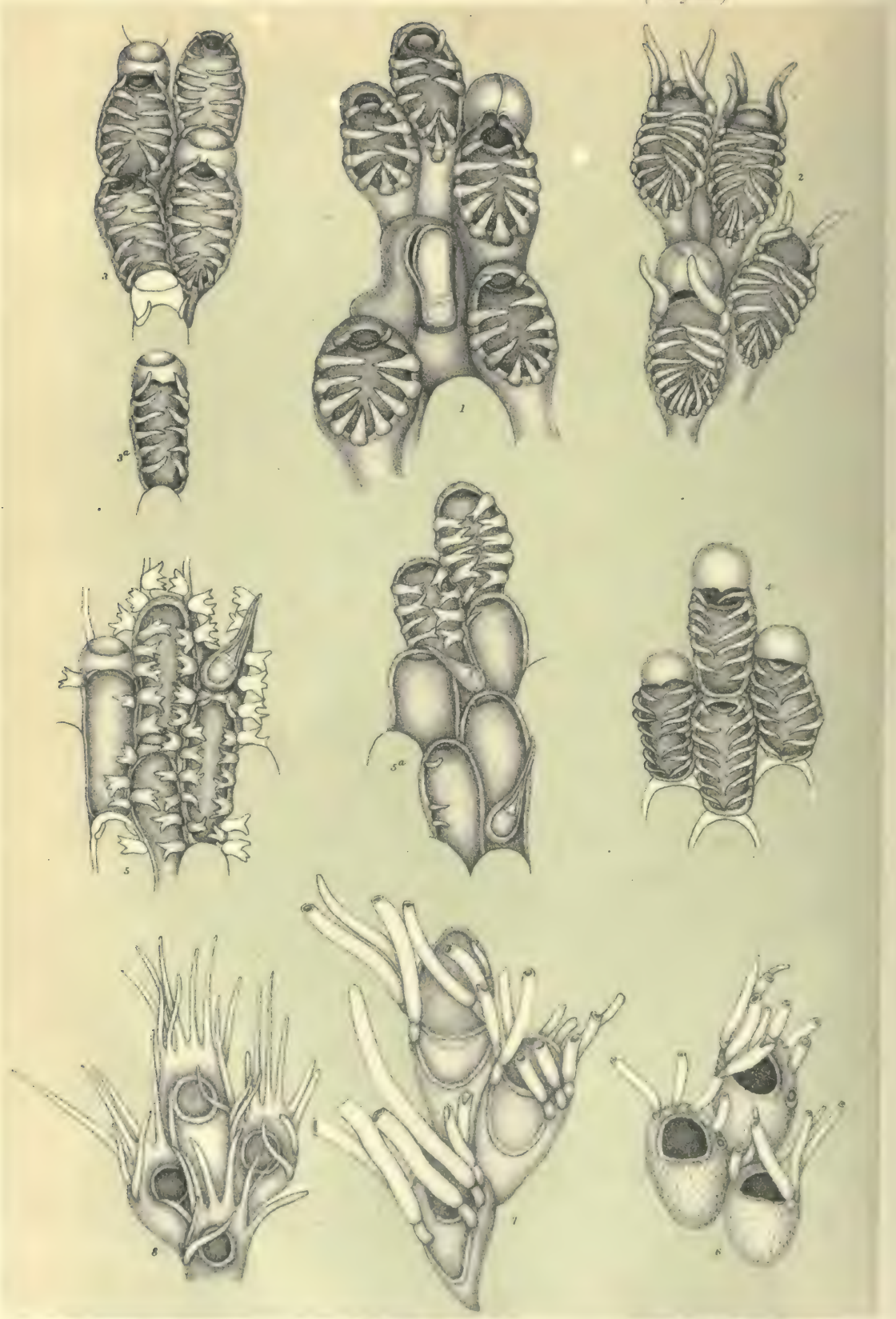


PLATE 127, FIG. 1.

MEMBRANIPORA PYRULA (HINCKS).

[Genus MEMBRANIPORA (BLAINVILLE). (Sub-king. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium spreading, encrusting, or occasionally sub-erect. Zoœcia contiguous, quincuncial or in transverse and longitudinal series, separated by raised margins; front membranous, but cell frequently produced below the area.]

DESCRIPTION.—Zoœcia pyriform, produced below the area, which is elliptical, with slightly thickened margins; two small, lateral oral spines; a series of 4 broad, incurved spines on either side, and 1–3 on the inferior edge. Oœcia large, with a distinct vertical ridge and a shallow pyriform depression or pit on each side of the margin. Avicularia scattered, replacing cells, with broadly spatulate mandibles.

REFERENCE.—*M. lineata*, P. McG., in Decade III.; *M. pyrula*, Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, common; Portland, Mr. Maplestone.

In the absence of authentic specimens or good figures, I previously referred this to *M. lineata*, Busk's figure of which my first mutilated specimens very much resembled. It is, however, quite distinct, and I therefore give a fuller description and better figure. The spines are very large, glistening, rib-like, and arch over the area, nearly meeting in the middle. They are attached a little beyond the edge by a slightly bulbous origin, and are usually 4 on each side and 1 or sometimes 2 or 3 at the bottom. The small oral spines are frequently absent. The avicularia are, in most specimens, numerous. They take the place of cells, and the mandible is very broadly spatulated.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 1, group of zoœcia, showing an oœcium and avicularium, magnified.

PLATE 127, FIG. 2.

MEMBRANIPORA CORBULA (HINCKS).

DESCRIPTION.—Zoœcia distinct, elongated, narrow below; area occupying nearly the whole front, its margin slightly thickened; 2 or 4 very large, pod-like, erect, oral spines; on each side of the area a series of usually 7 broad, incurved spines meeting in the middle and sometimes crossing. Oœcia globose, smooth, with

a broad, thickened band at the margin, and with several glistening lines radiating on the summit.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., Nov. 1880.

Port Phillip Heads ; Portland, Mr. Maplestone.

At once distinguished from *M. pyrula* and the other spinous species by the large, pod-like, articulated oral spines. Of these there are usually 4, but sometimes only 2. The marginal spines arise from bulbous origins closer to the margin than in *M. pyrula*, and bend over the area, meeting in the centre and frequently overlapping. The zoarium occasionally creeps over Bicellaria and other Polyzoa in a single, linear series.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 2, group of zoœcia, showing an oœcium, magnified.

PLATE 127, FIG. 3.

MEMBRANIPORA INARMATA (HINCKS).

DESCRIPTION.—Zoœcia large, distinct, usually oval, and rounded above and below ; area occupying the whole of the front of the cell ; a small, nearly erect spine on each side above, and a series (about 5 or 7) of narrow, incurved spines on each side. Oœcium projecting into the base of the zoœcium above, crossed at its base by a band formed by the cell-margin.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads, dredged by Mr. J. B. Wilson and myself.

The marginal spines are much more slender and have wider intervals between them than in *M. pyrula* and *corbula*. The oœcium projects into the base of the cell above, and has a thickened collar at the base formed by the cell-margin, an arrangement which also occurs in *M. serrata*.

EXPLANATION OF FIGURES.

PLATE 127.—Fig. 3, group of zoœcia, showing oœcia. Fig. 3*a*, single zoœcium, with oœcium.

PLATE 127, FIG. 4.

MEMBRANIPORA PECTINATA (McG.).

DESCRIPTION.—Zoœcia large, distinct, oval; 6–8 long, stout spines on each side, sloping forwards and inwards, and nearly meeting in the middle. Oœcia small, smooth, with the edge of the orifice straight, or with a short, sharp beak.

Port Phillip Heads.

I was at first inclined to refer this handsome species to *M. flustroides* (Hincks), but I think there is no doubt of their distinctness. The zoœcia are large, with a row of about 6 or 8 spines on each side. These spines are very long, projecting forwards and inwards in a very slightly curved manner, and, in some instances, nearly meeting in the centre. In a few zoœcia there are two shorter, smaller, more erect spines at the upper end. The oœcium is small, semi-globular and glistening. In the older there is a prominent, beak-like projection from the lower margin; in the younger the edge is smooth. Occasionally there is an obscure elevation running down the centre, and in some there is a thickening below showing an approximation to the transverse collar in *M. inarmata*.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 4, portion of specimen, magnified.

PLATE 127, FIG. 5.

MEMBRANIPORA SERRATA (McG.).

DESCRIPTION.—Zoœcia elongated, quadrate, or wider about the middle, or pointed below; area occupying the whole front, except occasionally the lower angles; margin plain, with a few acicular spines, or with numerous, serrated, horizontal denticles. Avicularium on a separate area at the base of a zoœcium; mandible very long. Oœcium projecting into the base of the cell above, crossed by a band in front.

REFERENCES.—*M. serrata*, P. MacGillivray, Trans. Roy. Soc. Vict., 1881; *M. acifera*, P. MacGillivray, Trans. Roy. Soc. Vict., 1881.

Port Phillip Heads.

This species can always be distinguished by the elongated, quadrate zoœcia, the position of the avicularium with its long mandible, and the rounded oœcium projecting into the base of the zoœcium above with its transverse collar formed by the cell-margin. In some cases the cells are entirely unarmed; in others there are one, two, or more uncinate spines; while, in most, the margins are thickly fringed with short, broad-ended, serrated denticles directed horizontally inwards. In many specimens the uncinate spines alone occur, and in others there are only the serrated denticles,

which induced me to describe these forms as distinct species. I have since, however, found specimens in which both co-exist, as is shown in that figured.

EXPLANATION OF FIGURES.

PLATE 127.—Fig. 5, portion of a specimen, showing the serrated denticles, two oœcia, and an avicularium. Fig. 5*a*, other zoœcia from the same, two of which are unarmed, two with uncinate spines, and the others with the serrated denticles, which are simpler and narrower than in the other figure; two avicularia are also shown.

PLATE 127, FIG. 6.

MEMBRANIPORA CILIATA (McG.).

As the figure given on Plate 25 is not quite correct, I give another. It is doubtful whether this species ought to be considered as a *Membranipora* with the cell produced below the area, or referred to *Amphiblestrum*. In some zoœcia there is a decided, though very narrow rim; while in others it is absent or only faintly indicated, as in the figure. The spines are sometimes thinner than in the figured specimen, but never so slender as shown in Plate 25.

In addition to the localities previously mentioned, Mr. Maplestone has found it at Portland.

PLATE 127, FIG. 7.

AMPHIBLESTRUM ALBISPINUM (McG.).

[Genus AMPHIBLESTRUM (GRAY). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Zoarium encrusting. Zoœcia with the aperture occupying the whole front, or with part of the zoœcium produced below; aperture partly filled in by an additional membranous or usually calcareous lamina.]

DESCRIPTION.—Zoœcia elongated, narrowed and extended downwards beyond the area; aperture occupying about half of the area, the lower margin slightly thickened; on each side a series of 3–5 enormous, pod-like, articulated spines, and generally 2 or 3 smaller from the upper margin.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

Queenscliff; Portland, Mr. Maplestone.

The zoœcia are much elongated downwards, almost trumpet-shaped, the area oval, surrounded by a thickened margin. When the zoœcia are closely packed, their real structure is not easily made out, but when straggling over a narrow alga, it is well seen, as in the figure.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 7, portion of a specimen on a narrow alga, magnified.

PLATE 127, FIG. 8.

MEMBRANIPORA SPINOSA (QUOY AND GAIMARD).

DESCRIPTION.—Zoœcia irregularly arranged, extending downwards beyond the area, which is sub-circular, with a thickened rim; a fringe of (about 7) long, rigid, pointed spines, usually united at their bases, surrounding the upper part of the zoœcium.

REFERENCES.—Figured by Busk in Polyzoa of Kerguelen's Land, Phil. Trans., vol. 168, pl. x., fig. 3; P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1881.

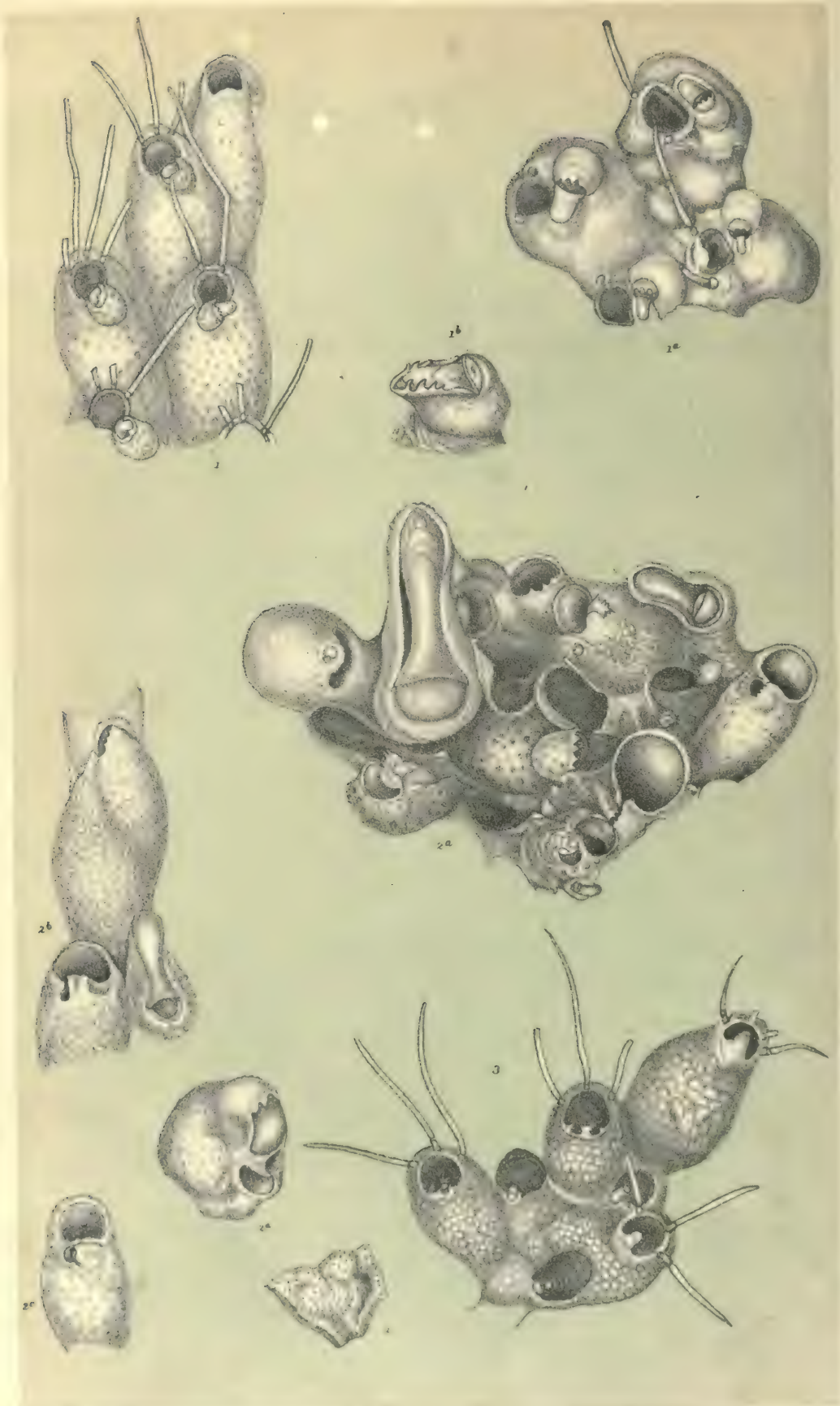
I have not seen the description in the voyage of the *Astrolabe*, and Busk's figure represents the zoœcia as much more regular, and does not show the common basis supporting the fringe of long, stiff spines. This is rather exaggerated in the figure, taken from a specimen where it was well marked, and in some cases it is almost wanting. It is only at the extreme edge of the zoaria that the arrangement of the zoœcia can be seen, being obscured at the other parts by the dense forest of spines.

EXPLANATION OF FIGURE.

PLATE 127.—Fig. 8, small portion, magnified. The common basis uniting the spines has been made too large.

The specimens and descriptions of these additional species of *Membranipora* have been presented by Mr. MacGillivray.

FREDERICK McCOY.



F. E. Mac Gillivray del. et lith.

Govt. Printer

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PLATE 128, FIG. 1.

CELLEPORA SPECIOSA (McG.).

[Genus CELLEPORA (FABRICIUS). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Celleporidæ.)

Gen. Char.—Zoarium encrusting, partly adnate, massive, foliaceous, erect and ramose, or glomerulous. Zoœcia, in the older parts, more or less erect and irregularly heaped together; one or more rostral processes (occasionally absent), usually bearing avicularia, in the neighbourhood of the mouth. Generally scattered vicarious avicularia.]

DESCRIPTION.—Zoarium encrusting. Marginal zoœcia horizontal, older irregularly heaped; surface smooth or finely granular; mouth straight and entire below; 2–4 long, slender spines articulated above; to one side of the lower lip an elevated, sessile avicularium, the mandible broadly linguate and the rostrum sharply dentate. Vicarious avicularia large, elongated, on elevated calcareous processes, the edges of the rostrum with several strong, recurved teeth.

Port Phillip Heads.

I have only seen a single small specimen, growing on a Retepore. It somewhat resembles *C. serratirostris*, but is distinguished by the long, articulated spines, the entire lower lip, and the different shape of the mandibles of the oral avicularia.

EXPLANATION OF FIGURES.

PLATE 128.—Fig. 1, zoœcia from the growing edge. Fig. 1*a*, zoœcia from an older portion. Fig. 1*b*, vicarious avicularium.

PLATE 128, FIG. 2.

CELLEPORA SERRATIROSTRIS (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia much confused, granulated; the younger, towards the growing edge, decumbent, elongated; the older more erect, stouter and confused; mouth at first entire, then with a deep sinus which becomes bridged across or closed by the junction of the opposite angles; a sub-oral process, usually bending to one side, with a large avicularium at the summit. Avicularia very numerous and of various forms, scattered over the zoarium; some very large, with long, spatulate, blunt or pointed mandibles, raised on considerable boat-like elevations; some spatulate and smaller; some on rounded cells, with broad mandibles and serrated rostra. Oœcia rounded.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1884.

Port Phillip Heads.

The very youngest zoœcia have the mouth straight and entire below, but, in almost all, a process of the peristome is seen rising on each side, eventually meeting in the centre and leaving a round opening which in time becomes filled in. Below the mouth a process rises on one side, extending upwards and to the opposite side, with a considerable avicularium on its summit, the edge of the rostrum being serrated. In some marginal zoœcia this process is very large and directed upwards, the avicularium situated obliquely on the summit. The older zoœcia vary much in form, being usually short and oblique or nearly erect. The sub-oral pore of the peristome can frequently still be seen, and the peristome is also, in some cases, produced above in a hooded manner, like a commencing oœcium, or it may be almost tubular with a slit in the lower edge. The aviculiferous process below the mouth is usually of small size, but is occasionally enormously developed, so as to be larger than the zoœcium itself. There are numerous vicarious avicularia, with spatulate mandibles, much raised, the point of the calcareous eminence frequently projecting over part of the neighbouring zoœcia.

EXPLANATION OF FIGURES.

PLATE 128.—Fig. 2, specimen, natural size. Fig. 2*a*, portion of central part of same, magnified. Fig. 2*b*, marginal zoœcia. Fig. 2*c*, single zoœcium, showing the sub-oral pore and short aviculiferous process. Fig. 2*d*, enormously developed sub-oral avicularium, showing the broad mandible, serrated rostrum, and mouth of the zoœcium (in the figure beneath the avicularium).

PLATE 128, FIG. 3.

CELLEPORA TRIDENTICULATA (BUSK).

DESCRIPTION.—Zoarium small, encrusting. Zoœcia immersed, irregular; surface granular; mouth straight below, rounded above, with 2–4 long, slender spines articulated above, and 3 small denticles (the middle hammer-shaped) within the lower margin. A minute avicularium, with a semicircular mandible, on a slightly elevated sub-oral rostrum.

REFERENCE.—Busk, *Challenger* Polyzoa, p. 198, pl. xxix., fig. 3.

Port Phillip Heads ; Warrnambool, Mr. Watts.

Of this species I have only two or three minute specimens, the only perfect one of which is that figured. It seems to be identical

with Busk's *C. tridenticulata*, although not entirely agreeing with the characters given by him. The number of spines, in my specimens, varies from 2 to 4; they are long, slender, and nearly straight. The zoœcia are very irregularly placed, immersed; the surface granular and glistening. The sub-oral avicularium (absent in some zoœcia) is very small, usually situated on a slightly elevated rostrum, which, however, is occasionally considerably developed. I have not seen the oœcia nor the vicarious avicularia with the long tubular processes described by Busk.

EXPLANATION OF FIGURE.

PLATE 128.—Fig. 3, portion of specimen, magnified.

The specimens and descriptions of the *Celleporæ* on this plate are from Mr. MacGillivray.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Insects)

Dr Wild del et lith

Prof. M.Coy direx.

Stream litho. Govt. Printing Office

PLATE 129.

ACRIPEZA RETICULATA (GUÉRIN).

THE NETTED ACRIPEZA.

[Genus ACRIPEZA (GUÉRIN). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Fam. Gryllidæ.)

Gen. Char.—Head small, oval, with a small frontal projection. Antennæ approximate, long, capillary, 1st joint large, 2nd short. Eyes globular, very prominent. Labrum rounded; mandibles pointed; maxillary palpi a little longer than the labial, terminal joint truncated, slightly swollen at tip, a little longer than the penultimate joint. Prothorax short, disc slightly flattened, transversely ridged, posterior margin very rounded, lateral keels slight. Presternum smooth, without spines, meso- and meta-sternum wide, most so in females. Elytra of female nearly as long as abdomen, hard, curved so as to fit over the back and sides of the abdomen, with very strong, prominent reticulations; of male long, narrow, rounded at tip, extending beyond the abdomen when at rest, longitudinal veins sinuous; stridulating organ opaque on left, with transparent centre on right. Wings absent in female; large in male, with anterior third covered with large, coarse reticulated ridges, rest of wing with the usual veining of the Gryllidæ. Abdomen short, thick, swollen in female, with ovipositor and appendages very small, scarcely visible; moderate in male, with setaceous appendages, short, curved inwards at tip; sub-anal plate of male notched at tip, not extending beyond tip of abdomen. Feet long, slender; thighs smooth; legs thick at extremity, with some fine short spines, anterior tibiæ with oval cavity at base covered by a membrane; posterior feet moderately short in the female, very long in the male; thighs of male slender, as large as tibiæ; upper keels of tibiæ with very small spines. Australia.]

DESCRIPTION.—*Male:* Elytra narrow; elytra and wings nearly three times as long as the abdomen; stridulating spot on base of right tegmina large, clear, transparent, and colorless, covered over by the left tegmina when at rest. Veining coarse and irregularly reticulated, but less so than in the female. Wings large, transparent, with brown veins, and slightly opaque and brown at anterior edge and tip. Length from forehead to end of abdomen, 9½ lines; length of each of the elytra (or tegmina) and wings, 1 in. 8 lines; width of tegmina, 7 lines; length of antennæ, 1 in. 1 line; length of thorax, 3 lines; length of hind thigh, 10 lines; length of hind tibia, 11 lines; length of anterior thigh, 4 lines; length of anterior tibia, 4 lines. *Color:* Of thorax and tegmina nearly opaque, dark brown, with indistinct greyish and blackish cloudy markings or spots; abdomen dark brown with lateral red bands on anterior part of each segment above; the edges of the segments have a row of about 18 small, longitudinal, bright blue, oblong spots; antennæ and legs blackish-brown, with transverse bands of pale yellowish-brown; head lighter, with two black bands from the eyes to the prothorax; anterior edge of prothorax showing a cinnabar-red band when head is bent down, invisible when head erect. *Female:* Length from forehead to end of abdomen, 1 in.; length of tegmina, 9 lines; length of abdomen, 8½ lines; depth of abdomen, 6 lines; width of tegmina from one inrolled edge to the other, 4 lines; length of thorax, 3 lines; length of antennæ, 1 in. 1 line; length of hind thigh, 8 lines; of hind tibia, 8½ lines; length of anterior thigh, 4½ lines; length of anterior tibia, 4 lines; abdominal appendages, ¾ line. Elytra oval, little longer than the abdomen, and curved so as to fit its convexity when covering it above and on the sides when at rest; with very prominent, coarse, unequal, irregularly anastomosing netted veins; abdominal segments plicated on hind edge; thorax oblong, flattened above, deflected at sides, posterior edge plicated, two transverse impressed lines in front. *Color:* Head yellowish-grey with irregular mottlings of black, two

broad longitudinal black bands from inner edge of eye to posterior margin of head, and one on each side from hind middle of eye extending on to lower margin of thorax, forming two spots, or a band interrupted in the middle; thorax colored like head, but with collar of bright vermilion-red between its anterior margin and the head; elytra nearly opaque, dark greyish-brown, with two large, irregular, roundish, black spots, one at middle, and the larger between it and the tip of each elytron; abdomen blackish-brown, the anterior margins above cinnabar-red, and the fimbriated posterior edges each with a row of small turquoise-blue spots, about 9 on each side; thighs, tibiæ, and palpi yellowish-grey, with broad transverse bands of black; antennæ black, with narrow distant transverse bands of greyish-yellow, less distinct than in the male.

REFERENCE.—Voy. de la Coquille, vol. 2, pt. 2, p. 153; At. Ins., t. 10, f. 2.

This most abnormal genus differs from all others of the order in the large vaulted tegmina wrapping round the short swollen abdomen in the female, and in that sex being without wings; while the male has the ordinary elongation and shape of abdomen and elytra, and has ample wings. The small size of the ovipositor is an exception to the rule in the family *Gryllidæ*.

Like all the Grasshoppers, or *Gryllidæ*, the tarsi of *Acripeza* are 4-jointed, unlike the 3-jointed tarsi of the Locusts, which they resemble in the shortness of the ovipositor. In the long slender antennæ, the drum in base of anterior tibiæ, and slender legs and thighs, and the stridulating apparatus at base of anterior wing, they are in accord with the *Gryllidæ*. The *Acripezæ* are, however, very peculiarly distinguished from both by the apterous, deformed females; and the extraordinarily rugged, coarse reticulation of the elytra.

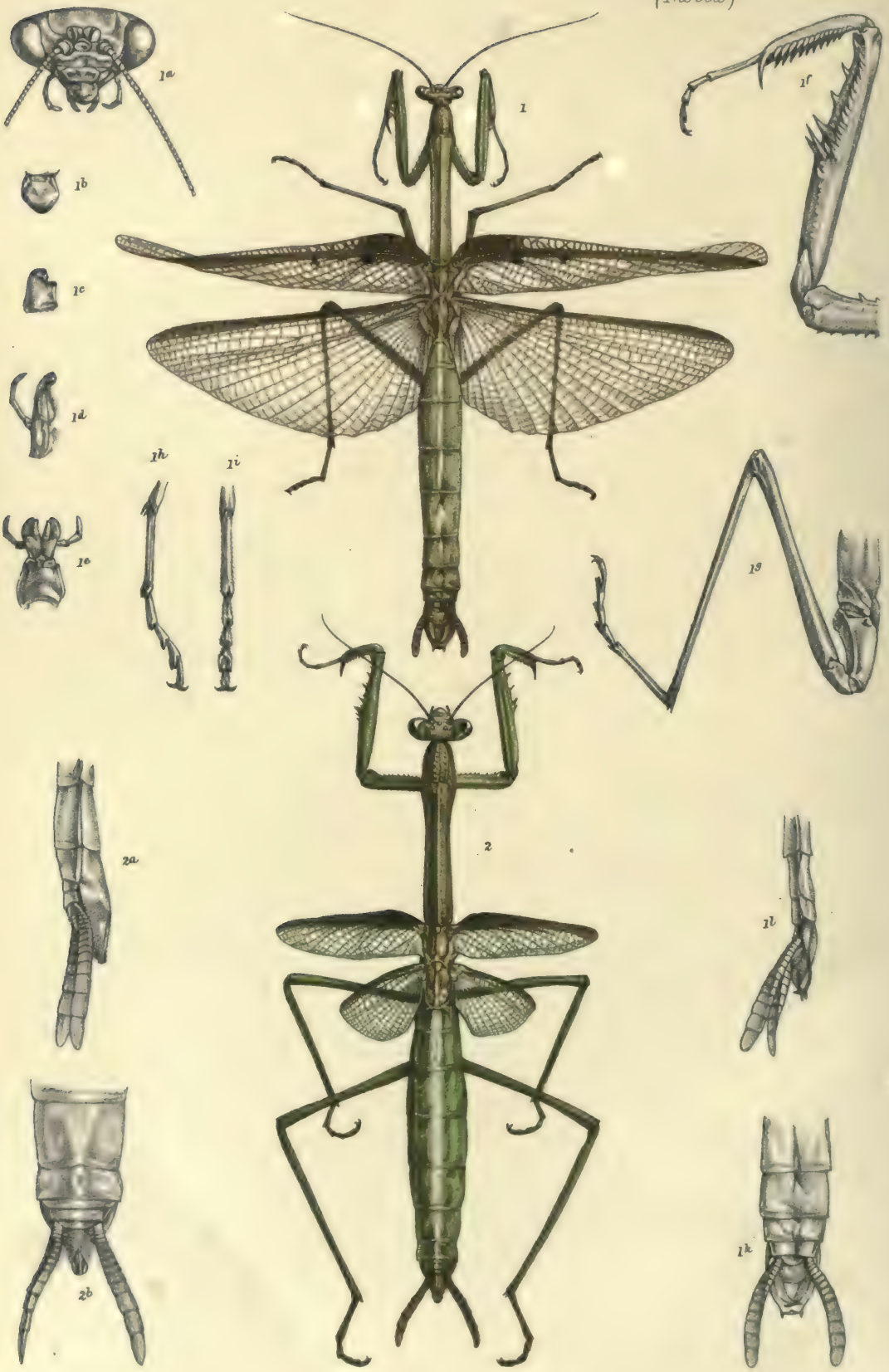
EXPLANATION OF FIGURES.

PLATE 129.—Fig. 1, male, natural size, in a flying position. Fig. 1*a*, front of head, magnified three diameters. Fig. 1*b*, upper lip, magnified three diameters. Fig. 1*c*, maxilla, magnified three diameters. Fig. 1*d*, mandible, showing small toothed apex, hood, and 5-jointed palpus, magnified three diameters. Fig. 1*e*, lower lip, showing 4 lobes and 3-jointed palpi, magnified three diameters. Fig. 1*f*, tarsus, side view, showing 4 joints. Fig. 1*g*, tarsus, viewed from below, showing division of basal joint, magnified three diameters. Fig. 1*h*, hind leg, magnified two diameters. Fig. 1*i*, anterior leg, magnified two diameters, showing drum in base of tibia. Fig. 1*k*, portion of antennæ, magnified six diameters. Fig. 1*l*, elytra, magnified two diameters, to show reticulation and talc-like stridulating organ at base of right elytron and its absence from base of left one. Fig. 1*m*, sternum, showing pairs of spines between bases of legs, magnified two diameters. Fig. 1*n*, side view of termination of abdomen, showing long appendages and sub-anal plate, magnified three diameters. Fig. 1*o*, same, viewed from behind. Fig. 2, male, in walking position, viewed sideways, natural size. Fig. 3, female, viewed from above, with elytra raised, natural size. Fig. 3*a*, right elytron, magnified two diameters, showing reticulation and absence of stridulating spot at base. Fig. 3*b*, side view of posterior end of abdomen, showing short appendages and ovipositor, magnified three diameters. Fig. 3*c*, same, viewed from behind. Fig. 3*d*, portion of antennæ, magnified six diameters. Fig. 4, female, with elytra covering abdomen, side view, natural size.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Insects)



Dr Wild. del. et lith.

Prof. McCoy direct.

Steam. Litho. Govt. Printing Office

PLATE 130, FIGS. 1-2.

MANTIS LATISTYLUS (SERV.).

THE BROAD-STYLED MANTIS.

[Genus MANTIS (LIN. RESTRICTED). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Raptoria. Fam. Mantidæ.)

Gen. Char.—Body elongate, smooth. Head wide, triangular, anterior face divided transversely, upper part girt round on the sides and in front by a semicircular ridge; vertex smooth. Eyes large, rounded; ocelli, 3, in a triangle, above the antennæ and between the eyes, much larger in the male than the female. Antennæ setaceous, multiarticulate, hair-like in the female, thicker and much longer in the males, between the eyes. Labium (or lower lip) of 4 nearly equal lobes jointed near middle; palpi short, 3-jointed; labrum (or upper lip) ovate, entire; mandibles strong, trigonal, with 1 strong tooth below and 2 or 3 at apex; maxillæ long, outer lobe galeated, inner lobe with 2 teeth at apex; palpi of 5 filiform joints, pointed, tips reaching little beyond maxillæ. Prothorax very long, narrow, smooth, a little dilated laterally at its anterior part, where the anterior pair of legs are attached; margined on the sides; rest of thorax short, concealed by the tegmina and wings when at rest; no scutellum. Abdomen of 9 dorsal joints in both sexes; 6 ventral in female, and 8 in male, simple to the tip, depressed, dilated laterally behind the middle, most so in the female; 2 articulated processes at tip, and a short inarticulate pair in male. Tegmina elongate, oval. Legs long, 2 hind pair simple, anterior pair raptorial. Tarsi five-jointed, the first joint much longer than the others.]

DESCRIPTION.—*Female:* Body moderate, narrow. Head very wide; eyes very large, prominent; antennæ very slender, about half the length of the prothorax. Prothorax with a strong median keel, a smaller lateral marginal one on each side, slightly serrated on anterior half; dilatation over anterior legs small, anterior fourth having an oval granular space surrounded by an impressed line, and having midlines impressed; hinder portion smooth. Abdomen smooth, slightly dilated behind the middle; articulated styles large, pubescent, equal in length to the two first joints of abdomen, the 6 or 7 basal joints short, narrowed, less than half as long as wide, and convex; 7 or 8 terminal joints, wider, longer, flattened, and the terminal and penultimate ones longer than wide. Legs moderate, coxæ of anterior pairs half the length of prothorax, with a row of fine irregular spines on anterior ridge; thigh about two-thirds the length of prothorax, with 5 or 6 long, strong spines on outer lower ridge, and more numerous, smaller ones on inner margin of groove; tibia about half the length of the thigh, ending in a long, curved, sharp spine, with a row of about 12 small spines on each of the two posterior ridges. Wings very short; elytra not reaching half the length of the abdomen, narrow, nearly equally wide throughout, elliptically pointed at end, with posterior two-thirds transparent; wings only two-thirds the length of the elytra, broad, transparent, except the narrow anterior border. *Color:* Body and legs all green, with brownish tinges especially on sides of prothorax, with a conspicuous satiny-white longitudinal band along middle of upper side of abdomen, and meta- and meso-thorax; antennæ, tarsi, and abdominal styles brown. *Measurements:* Length, 3 ins. 6 lines. Proportional measurements to length, taken as unity: Length or depth of vertical face, $\frac{8}{100}$; width of head, including eyes, $\frac{10}{100}$; length of antennæ, $\frac{20}{100}$; length of prothorax, $\frac{33}{100}$; mesothorax, $\frac{7}{100}$; metathorax, $\frac{10}{100}$; length of abdomen, $\frac{46}{100}$; articulated styles, $\frac{15}{100}$; length of anterior coxæ, $\frac{19}{100}$; width, $\frac{4}{100}$; femur, $\frac{21}{100}$; length of elytra, $\frac{27}{100}$; width, $\frac{2}{100}$; length of wing, $\frac{16}{100}$; width, $\frac{10}{100}$. *Male:* More slender,

and with smaller, raptorial anterior legs than the female; prothorax similarly keeled, but the anterior portion in front of legs less distinctly granular; elytra and wings extending nearly to end of abdomen; articulated styles as in female, but, in addition, 2 very small inarticulate styles at end of last segment below, $\frac{1}{3}$ line long, and 2 hooked processes two-thirds of a line long in middle. *Color:* All brown on body, legs, and anterior margin of elytra and wings, the hinder portions of wings and elytra equally colorless and transparent, a large oval patch on the under-side of anterior base of elytra of the color and lustre of pitch, as in the female, slightly showing through the brown of the upper side; in many specimens two small black spots on elytra close below the strong vein bounding the anterior margin, at about the width of the elytra from their base, the second smaller one about the same distance farther towards tip (the outer, or sometimes both these, spots absent). Length, 3 ins. 6 lines; width of head and eyes, $\frac{8}{100}$; length of antennæ, $\frac{35}{100}$; length of prothorax, $\frac{33}{100}$; articulated styles, $\frac{10}{100}$; length of coxæ of anterior raptorial legs, $\frac{16}{100}$; width, $\frac{3}{100}$; femur, $\frac{12}{100}$; length of elytra, $\frac{56}{100}$; width, $\frac{11}{100}$; width of front margin at middle, $\frac{3}{100}$; length of wing, $\frac{53}{100}$; width, $\frac{25}{100}$; width of colored front margin at middle, $\frac{2}{100}$.

REFERENCE.—Audinet Serville Hist. Nat. des Insect. Orthop., p. 179.

In all the species of *Mantis* the males have the body longer and more slender, the head and legs smaller, the wings larger, and the elytra more transparent, longer, and more pointed than in the female. The terminal segment of the abdomen of females is as large as the preceding ones, but is very small in the males. The upper wings or tegmina have numerous veins, are lapped one over the other horizontally on the back when at rest, and in the males are nearly of the same consistence as the hind wings.

The long oval eggs are laid in a roundish lump attached to twigs of trees, each egg in a separate cell immersed in a gum-like secretion. The young larvæ are like the adult, but want the wings. The pupæ have very short wings and tegmina.

The family *Mantidæ*, including all the genera and species of *Mantis*, constitutes the section *Raptoria* of the Orthopterous or Dermapterous insects, the whole of them being carnivorous, and feeding upon living insects, which they catch and hold by squeezing them between the toothed inner edges of the tibia and leg of the anterior pair of raptorial legs, like a pair of jaws, while eating them by the jaws of the mouth.

Using the four simple hinder legs for walking, all the kinds of *Mantis* have the singular habit of raising the extraordinarily long, slender prothorax at a considerable angle with the rest of the body,

and holding up the two great raptorial anterior pair of legs in an attitude like that of human prayer, remaining motionless, as if praying, for hours ; attracting the sympathetic respect of religious people, in the more ignorant ages, of Europe and among the Mahomedans of our own time, and being worshipped by the Hottentots. The name of praying Mantis, or Soothsayer, is popularly given to them in ignorance of their really cruel, stealthy, rapacious habits. The "raptorial legs" are curiously unlike those of any other insects, and resemble jaws with sharp teeth when in action ; they are much thicker and more muscular than the two hinder pairs of legs ; the coxæ are very long, and the trochanters short and triangular ; the femora thick, and with a deep channel on the terminal half of the under-side, the two edges of which are set with long, sharp, tooth-like spines ; the tibiæ are short, curved, compressed, and set with a row of tooth-like spines on under edge, ending in a curved sharp point, the whole fitting into the channel between the two rows of teeth in the femora when bent against them or closed. The tarsi are all 5-jointed and simple and slender ; the first joint nearly as long as all the rest put together. The posterior legs are moderately long and slender, and formed for walking.

The name Mantis is, not only from the prophet-like customary attitude, but an allusion to their long emaciated forms ; Theocritus being so injudicious as to see a resemblance between them and a thin young girl with long skinny arms—"Præmacram ac pretenuem puellam, *μαντιν*."

The *Mantidæ* are often confounded with the leaf-eating *Phasmæ* (of which examples are figured on our Plates 69, 70, and 79 of Decades VII. and VIII.), from which they differ in the raptorial anterior legs, carnivorous habits, and many points of structure. They wait motionless on trees and shrubs for the approach of smaller insects, which they suddenly snap up in the bend of their raptorial fore-legs, tearing them voraciously with their mandibles.

This is one of the large and rarer species of Mantis, although the first described of the Australian kinds. It is remarkable not

only for the width of the articulated styles at the end of the abdomen of both sexes, but for the shortness of the elytra and wings in the female. There is little or no difference in the length of the male and female individuals; but the males are perceptibly more slender in body, head, and raptorial fore-legs. There is another species with equally wide styles and of the same size, but having the much longer elytra of the female with the proportion to total length of $\frac{40}{100}$, distinguished also by the whole of the elytra being of the same brown color, imperfect transparency, and coarse veins of the anterior margin, for which the name *Mantis fusci-elytris* might be suggested. The two small dark spots on the elytra of *M. latistylus* are more frequently absent than present, and in some of our specimens there is one on one side and two on the other.

This curious Mantis has not been figured before.

Explanation of Figures.

Plate 130.—Fig. 1, male, natural size (the elytra curled up spirally by drying while the artist was lithographing the figure). Fig. 1*a*, front view of head, magnified three diameters. Fig. 1*b*, upper lip, magnified three diameters. Fig. 1*c*, mandible, magnified three diameters. Fig. 1*d*, maxilla and palpi, magnified three diameters. Fig. 1*e*, lower lip, with palpi, magnified three diameters. Fig. 1*f*, anterior or raptorial arm, viewed from the side, magnified two diameters. Fig. 1*g*, ambulatory leg, magnified two diameters. Fig. 1*h*, tarsus, side view, magnified three diameters. Fig. 1*i*, same, viewed from below. Fig. 1*k*, end of abdomen of male, with appendages and styles, viewed from above, magnified two diameters. Fig. 1*l*, same, viewed sideways. Fig. 2, female, natural size. Fig. 2*a*, end of abdomen, viewed sideways, magnified two diameters. Fig. 2*b*, same, viewed from above.

Frederick McCoy.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XIV.

BY

FREDERICK McCOY, C.M.G.; Sc. D. Cantab., F.R.S.,

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PREFACE.

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This fourteenth Decade gives detailed figures, on the first plate, No. 131, of the large species of Blue-tongued Lizard, *Cyclodus nigroluteus*, found near Melbourne and generally in the southern portions of the colony, where it replaces the *Cyclodus gigas*, another Blue-tongued Lizard (previously figured on Plate 72), of the warmer more northern localities.

The second plate, No. 132, gives figures with details of structure of two of the curious nocturnal climbing Lizards called Geckoes; one illustrating the group with retractile sheathed claws and dilated toes; the other belonging to the slender-toed group with non-retractile claws, without sheath.

The third plate illustrates another of the species of English Fish sometimes occurring, though very rarely, in our waters, the Ray's Bream; one of those famed as a delicacy by the European gourmand, and which appeared for the first time on the Victorian coast at Portland in great numbers in April, 1884, not having been seen by our fishermen before or since.

Plate 134 gives a figure of one of the numerous beautiful "Parrot-fishes" of the colony, the *Labrichthys Bleekeri*, not figured before.

The fifth plate illustrates the Sea Gar-fish, or Half-beak, of our coasts; and the Saury Pike, of the variety usually called *Scomberesox Forsteri*, although I doubt its distinction from the European Saury Pike, *S. saurus*.

The next three plates continue the illustrations of Victorian Polyzoa, for the specimens and descriptions of which I am indebted to Mr. MacGillivray.

The following plate, No. 139, gives figures for the first time of our commonest solitary Locust of the flat-horned group, the *Opsomala sordida;* and also of a Locust, entirely wingless in the adult state of both sexes, the *Mesops pedestris*, remarkable for having the eye in the middle of the side of a long conical head, far from the antennæ.

The last plate illustrates in full detail our commonest species of the division of Keel-backed Locusts, having the thorax compressed into a thin prominent keel, the *Tropinotus Australis*.

The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest, and of which good figures do not exist or are not easily accessible.

FREDERICK MCCOY.

20th May, 1887.

D.r Wild del. et lith.

Prof. McCoy dirx.

Steam at the Govt. Printing Office.

PLATE 131.

CYCLODUS NIGROLUTEUS (QUOY AND GAIM. SP.).

THE SOUTHERN, OR BLOTCHED, BLUE-TONGUED LIZARD.

[Genus CYCLODUS (WAGLER). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Scincidæ.)

Gen. Char.—Form moderately thick, elongate, fusiform. Head large, thick, sub-trigonal, obtusely pointed in front. Neck short, thick. Head-shields thick, rather rugose; nasal plates near the tip of snout, touching (or nearly) each other above, ovato-trigonal; nostril in centre of nasal plate, with a curved furrow bordering its posterior edge*; inter-nasal plate rhombic; no supra nasals; fronto-nasals two, moderate, touching; frontal large, broad, obtuse-angled in front, narrow behind; two moderately large fronto-parietal plates; parietals large; inter-parietal resembling the frontal, and nearly as long, but much narrower, acute-angled in front; four superciliary plates over each eye, the second largest; about 5 rows of temporal plates between the eye and the ear; polygonal occipital shields in one or more transverse rows; orbit surrounded by a row of small plates; two frenal plates between the nasal plate and the orbit; lower eyelid scaly. Ear-opening large. Scales of back and sides bony, large, convex, sub-hexagonal, rugose, with obscure, diverging grooves; scales of belly thinner and smoother. Legs four, nearly equal, small, short, strong; feet small, each with five short, cylindrical, sub-equal toes; claws short, thick. Tail short, rather less than one-third of the total length, sub-cylindrical, very slightly compressed laterally, tapering, with rather thicker scales than the back of the body, and a central row of large, broad scales below. Tongue short, flat, scaly, slightly notched at the point. Teeth on edge of jaws bluntly rounded; palate without teeth, with a triangular notch behind.]

DESCRIPTION.—*Form:* Moderately elongate, rounded; head trigonal; snout obtusely pointed; neck short. *Plates:* Nasals nearly touching over tip of rostral, a curved sulcus bordering posterior edge of nostril; the four temporal plates immediately behind the rows of ocular plates surrounding the eye, from the parietal plates above to the hindmost labial plate below, less than half the length of the temporal plates next following them posteriorly; rostral plate wider than long; inter-nasal plate slightly longer than wide; width of anterior part of frontal plate about three-fourths of the length; anterior edge of ear dentated with a few projecting scales. *Colour:* Ground colour of whole body and head above and below rich, dull yellow with blackish-brown longitudinal dashes, leaving the yellow in the form of two longitudinal rows of about five to seven large, irregular, rounded patches extending from the neck to the base of tail; tail irregularly ringed with about five yellow bands about three or four scales wide, and five or six blackish-brown rings about two or three scales wide; throat unspotted pale yellow; sides and belly irregularly netted with longitudinal black dashes on the yellow ground; a few transverse dark dashes on the hind legs; tongue bright Prussian blue.

MEASUREMENTS.

	Feet.	ins.	lines.
Total length of rather large specimen	1	3	6
Length of head from snout to anterior edge of ear	0	2	9
Length of inter-nasal plate...	0	0	4½
Width „ „ „	0	0	5
Length of frontal plate	0	0	5

* Except in *C. casuarinæ*, now the type of the genus *Omolepida*.

MEASUREMENTS—*continued.*

	Ft.	ins.	lines.
Greatest width of frontal plate	0	0	3½
Length of inter-parietal	0	0	4
Greatest width of inter-parietal	0	0	2½
Height of rostral plate	0	0	3
Width „ „	0	0	4
Diameter of ear	0	0	2½
Length from tip of snout to anterior edge of shoulder ...	0	2	10
„ of anterior limb to tip of longest claw	0	1	7
„ of longest toe and claw	0	0	4
„ from anterior edge of shoulder to anterior edge of thigh	0	6	9
„ of hind limb to extremity of longest claw	0	1	9
„ of tail	0	4	5
Girth round middle of body	0	6	0
Number of transverse rows of scales in 1 inch at middle of back		Four.	
„ „ longitudinal „ „ „ „		Five.	

REFERENCE.=*Scincus nigroluteus*, Quoy & Gaimard, Voy. Uran., Rept. t. 41 = *Cyclodus* id. Wagler Syst. Amph., p. 162.

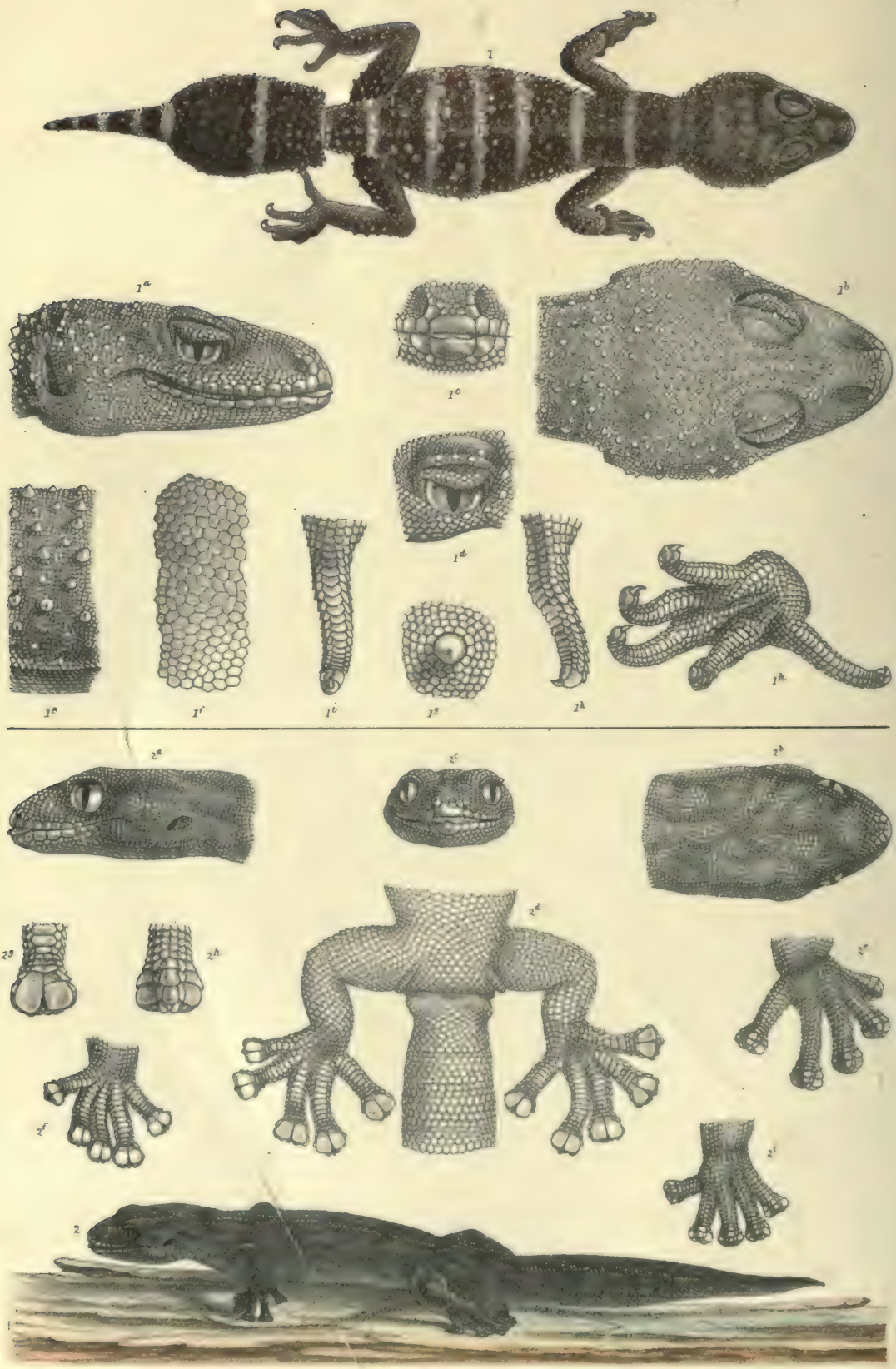
This species is very like the *C. gigas* (Bod.), figured in our Plate 72, but is readily distinguished by the shortness of the first, or most anterior, row of the temporal plates behind the posterior oculars, as compared with the much greater length of the next succeeding ones, while in *C. gigas* the anterior ones are double the length of the next posterior ones. It is also distinguished by the longitudinal rows of large, rounded, light blotches of yellow, instead of the more numerous, irregular, transverse, alternately dark and light bands of the former species.

Not uncommon about Melbourne, where it is generally called "Blue-tongued Lizard," or "Sleepy Lizard." When kept in confinement it feeds on bread and milk, lapping the milk readily.

EXPLANATION OF FIGURES.

PLATE 131.—Fig. 1, average specimen, half the natural size. Fig. 1*a*, outline of plates of top of head, half the natural size. Fig. 1*b*, outline of plates of side of head, half the natural size, showing the characteristic shortness of first row of plates behind the posterior sub-orbitals. Fig. 1c, two plates of back, natural size.

FREDERICK McCOY.



D.J. Wild del. et lith. F. & F. McCoy dirext. Steam Litho. Govt. Printing Office.

PLATE 132, FIG. 1.

PHYLLURUS MILIUSII (BORY).

THE THICK-TAILED GECKO.

[Genus PHYLLURUS (CUV.). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Nyctisaura. Fam. Geckotidæ).

Gen. Char.—Head trigonal, broad behind; one small, quadrate chin-plate; neck narrow; body moderately broad, moderately depressed; tail cordate, trigonal, thick, broad, and depressed near base, tapering rapidly to posterior end, which is conical; base constricted, very narrow. Legs long, slender: toes all with non-retractile claws, elongate, slender, compressed; sides not serrated; joints bent at right angles to each other, the base slightly thickened below with distinct transverse plates; outer hind toe versatile (at right angles to the others). Sides of body with a slightly prominent fold of skin from base of arm to base of thigh. Scales minute, granular, with scattered conical tubercles on upper surface. No femoral nor preanal pores. Eyes nocturnal, with linear, erect pupil; upper eye-lid large, lower one very small.]

DESCRIPTION.—Head short, thick, flattened, trigonal, wide behind; an oval depression open behind on top of head, bordered by larger granules; space between the eyes half the diameter of the orbit; rostral plate sub-hexagonal, 3 times wider than high; width about equalling $2\frac{1}{2}$ of next labial plates; upper lateral side of rostral bears a small plate, on outer edge of which is the round nostril over first labial; chin-plate slightly less wide, but deeper, than the rostral; no plates under the chin, nor behind the nostrils. Under eye-lid very short, not covering cornea; upper very large, forming two parallel folds round the upper half of eye; pupil elliptical, vertical. Ear-opening oval. Neck and body narrow. Legs slender; toes slender, nearly cylindrical, arched at the end, one row of transverse plates below each; claws very short. Tail very narrow at base, then suddenly broad, thick, cordate, with scattered conical tubercles above; sides rounded and slightly tubercular, then tapering quickly and becoming round in section, and tapering to a fine point at posterior end. *Scales:* Entire surface of head, body, limbs, and tail, above and below, covered with close, extremely minute, rounded granules, with larger conical tubercles scattered on the upper surface; the larger tubercles on the head blunter and smaller than on the body. Labial plates, $\frac{12}{12}$; no plate between the nostrils. *Color:* Upper side of body marron or chestnut-brown, tail darker chocolate, with several narrow white cross bands, 2 or 3 on neck, and 4 or 5 on tail, and transverse rows of white spots on back, smaller white spots on upper surface of legs; under surface of throat, body, legs, and tail plain greyish-white. *Measurements:* Average total length from tip of snout to end of tail, $5\frac{1}{2}$ inches. Proportional measurements (to total length as 100): Length of head, $\frac{22}{100}$; width of head behind, $\frac{16}{100}$; width of neck, $\frac{9}{100}$; width of middle of body, $\frac{15}{100}$; length of tail, $\frac{39}{100}$; width of tail at base, $\frac{6}{100}$; at middle of dilated portion, $\frac{15}{100}$; at base of slender posterior half, $\frac{5}{100}$; length of dilated portion, $\frac{20}{100}$; depth of head, $\frac{11}{100}$; diameter of eye, $\frac{2\frac{1}{2}}{100}$; from tip of snout to anterior edge of eye, $\frac{10}{100}$; to ear, $\frac{20}{100}$; to shoulder, $\frac{28}{100}$; to front of thigh, $\frac{52}{100}$; from shoulder to tip of fingers, $\frac{28}{100}$; length of longest finger, $\frac{5}{100}$; from hip to end of longest toe, $\frac{33}{100}$; length of longest toe, $\frac{7\frac{1}{2}}{100}$.

REFERENCE.—Bory de Saint-Vincent, Dict. Class. d'Hist. Nat., v. 7, p. 183, t. not numbered, fig. 1.

The Geckoes form one of the most peculiar divisions of the saurian reptiles. They are all small disagreeable-looking Lizards, inhabiting warm countries, and are nocturnal in their habits, catching insects, especially caterpillars and other larvæ, and worms, on which they feed by night; and hiding under the bark of trees and in other crevices by day, and especially shunning the glare of the sun, in which the other kinds of Lizards delight. They have a wide, flat head, narrow neck, the body always depressed, or flattened from above downwards, broadest in the middle, and never have any median crest on the body or tail. The legs are strong, the feet short, with the toes rather short and nearly equal in length, usually furnished with sharp, retractile claws, like those of a cat, for climbing the bark of trees, and generally furnished with transverse membranous plates below, recalling the structure of the foot of a fly, and enabling them to run up smooth surfaces, such as a perpendicular wall of a house, or on the ceiling of a room, with great swiftness, darting on the flies and other insects, which it can only catch with its jaws, by pouncing upon them and swallowing them whole, the œsophagus or gullet being unusually large, to allow of this mode of feeding, and the articulation of the lower jaw being far behind the head, as in the crocodiles, to form a large gape. The structure of the tongue is a distinguishing peculiarity of the whole group, being short, thick, fleshy, blunt, and slightly notched in front, which is free, but with very slight powers of protrusion, contrasting strongly with the Monitors, for instance (see Plate 41, Decade V.). Like most nocturnal animals, the eyes are very large, and the pupil usually vertical and elliptical, with fringed edge; the eye-lids are continuous, like those of a chameleon, the under one very small, and the upper very large, and a transverse winking one moving transversely between them.

They are remarkable for uttering a sharp, loud cry or click, in some species like the word "Geck-o," from which their name arises.

The skin seems soft and almost naked, from the minuteness and granular character of the scales, the head being destitute of conspicuous plates, unlike most Lizards. The tail is less than the body in length, and so brittle that it falls off even from a slight jar or

sudden awkward movement from fright; the new tail, which soon replaces the lost one, is generally slightly different in size, color, and scaling from the original, and must not be mistaken for a new specific character; it is generally depressed, often fusiform, and sometimes flattened and dilated. The teeth are confined to the jaws, and are "pleurodont," or ranged in a channel in each jaw, and only fixed to the outer parapet of bone by the side or external face of the root; they are close, nearly equal, compressed, and sharp-pointed.

The males are smaller, more slender, and more agile, and more brightly colored than the females.

The brown and grey mottled colors of most of the species vary a good deal at will, to assimilate to the tint and style of coloring of the bark, &c., on which they rest, and from which only the brilliancy of their eyes distinguishes them. Their movements are sudden, and surprisingly swift and noiseless.

The various genera of Geckoes form two groups, the one with the toes more or less dilated, and having retractile claws, hooked, and lodged in a sheath when withdrawn; the other with slender toes and simple, non-retractile claws, not hooked, and with no sheath; and of these two groups our plate gives an example of each.

The present species, *P. Miliusii*, is one of the most striking Geckoes of the slender-toed group, having the toes bent nearly at right angles with each joint, giving them the appearance of having been broken or deformed. The broad, thick, heart-shaped tail, and beautiful, transverse, dark and light banding of the color of the upper surface, render this one of the most striking Lizards of the northern warm parts of the colony. It is rarely found south of Sandhurst.

EXPLANATION OF FIGURES.

PLATE 132.—Fig. 1, average specimen, natural size, seen from above. Fig. 1*a*, side view of head, magnified two diameters. Fig. 1*b*, top view of head, magnified two diameters. Fig. 1*c*, front view of snout, to show rostral, chin, and anterior labial, plates, with the plate at anterior inner edge of each nostril, and the granules between the nostrils; magnified two diameters. Fig. 1*d*, eye and eye-lids, magnified two diameters. Fig. 1*e*, portion of back and side, magnified two diameters, showing the conical tubercles amongst the granular scales of back, the prominent lateral ridge or fold, and the smooth belly scales. Fig. 1*f*, smooth scales of belly, magnified two diameters. Fig. 1*g*, conical tubercle of back, with surrounding small granular scales, magnified six diameters. Fig. 1*h*, under-side of foot, showing transverse scaling and projecting claws, magnified three diameters. Fig. 1*i*, one of the toes, magnified four diameters, viewed from below, to show scaling. Fig. 1*k*, ditto, viewed from the side.

PLATE 132, FIG. 2.

DIPLODACTYLUS MARMORATUS (GRAY).

THE MARBLED GECKO.

[Genus DIPLODACTYLUS (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Nyctisaura. Family Geckotidæ.)

Gen. Char.—Head, body, and tail moderately elongate, rounded, depressed; tail conical or fusiform, round in section; scales of body and tail small, similar, and alike above and below. Toes all with claws, linear, dilated and truncated at the tip, which is formed of the penultimate joint; last joint small, inflexed in a notch between the dilated pads; under-side of each toe with one row of broad, transverse plates, ending with a pair of large, convex, oval, thick plates on the dilated tip, rounded at the distal end; hind toe of hind foot versatile. Tongue thick, short, convex, slightly notched at tip. Eyes with vertical, narrow, linear pupil; eye-lids circular, not connivent.]

DESCRIPTION.—*Form:* Head sub-pentagonal, depressed, covered with very small, sub-equal, rounded, granular scales; rostral plate large, pentagonal, with 3 plates arching from the upper side round to the first labial enclosing the nostril, which touches the first labial and upper lateral angle of the rostral plate. Eight gradually diminishing upper labials. Lower rostral plate quadrate, small, little larger than the labials, which are 8 or 9 in number, gradually diminishing from the front. Ear, a small, simple, round aperture. Eye, surrounded with a circle of small granules. Hand, with the fingers gradually enlarging to the fourth, which is longest; fifth nearly equals the second; each with a small claw hid in the notch between the dilated pair of scales, forming the tip, covered above with several rows of small scales, the last two or three increased in size; on the under-side each toe has a row of transverse plates along the middle, with two abruptly larger, quadrate, porous ones at the tip. Hind foot resembling the anterior, but larger, and having the outer or hind toe versatile or standing at right angles to the others. Whole body and tail, above and below, covered with nearly equal and similar, rhombic, granular scales. Tongue broad, thick, flat, granular, with a small notch in front. Tail nearly circular in section, slightly fusiform, perceptibly narrower at base than at one-third its length farther towards the tip. *Color:* Very pale purplish-brown above, marbled from top of head over back of body and tail, and crossed at intervals of about a quarter of an inch with very irregular, narrow, scribbled, or vermiculate darker marks irregularly undulated, and joined in imperfect, looped, and angulated patterns, often with a median row of obscure, paler, oblong, or irregular angular spots; pale, ashy, or purplish, livid-whitish below. Iris bright brown-bronze, with black irregular streaks. Inside of mouth and tongue dull yellow. Total length of average individual, 4 ins. 7 lines. Proportional measurements, (referred to length as 100): Length of head, $\frac{12}{100}$; length of gape, which reaches to middle of eye, $\frac{6\frac{1}{2}}{100}$; diameter of eye, $\frac{2}{100}$; snout to ear, $\frac{11}{100}$; neck, $\frac{8}{100}$; from snout to shoulder, $\frac{16}{100}$; fore-arm, $\frac{6}{100}$; elbow to wrist, $\frac{6}{100}$; longest (fourth) toe, $\frac{5}{100}$; front of shoulder to front of thigh, $\frac{26}{100}$; length of thigh, $\frac{8}{100}$; knee to ancle, $\frac{6}{100}$; longest (fourth) toe, $\frac{6}{100}$; snout to base of tail, $\frac{47}{100}$; length of tail, $\frac{54}{100}$; greatest width of head, $\frac{10}{100}$; greatest width of body, $\frac{10}{100}$; width of base of tail, $\frac{6}{100}$; width of tail at one-third of length from base, $\frac{8}{100}$. Number of scales about middle of back in three lines, 20.

REFERENCE.—Gray, Zool. Er. & Ter., t. 15, f. 6, Cat. B. M., Lizards, p. 149.

Like all the Geckoes, these *Diplodactyli* are small, nocturnal Lizards, with the tips of the toes generally more or less dilated. This species is a good example of those having an apparent doubling of the greatly swollen distal ends of the toes, with the terminal joint and claw so minute as to seem hid in the notch between the two large pads.

They live on insects and worms, which they swallow whole, the œsophagus being very large. The males are smaller than the females. The tails are very brittle and easily lost, and reproduced, with some slight differences, from the original in the form of the scales, &c.

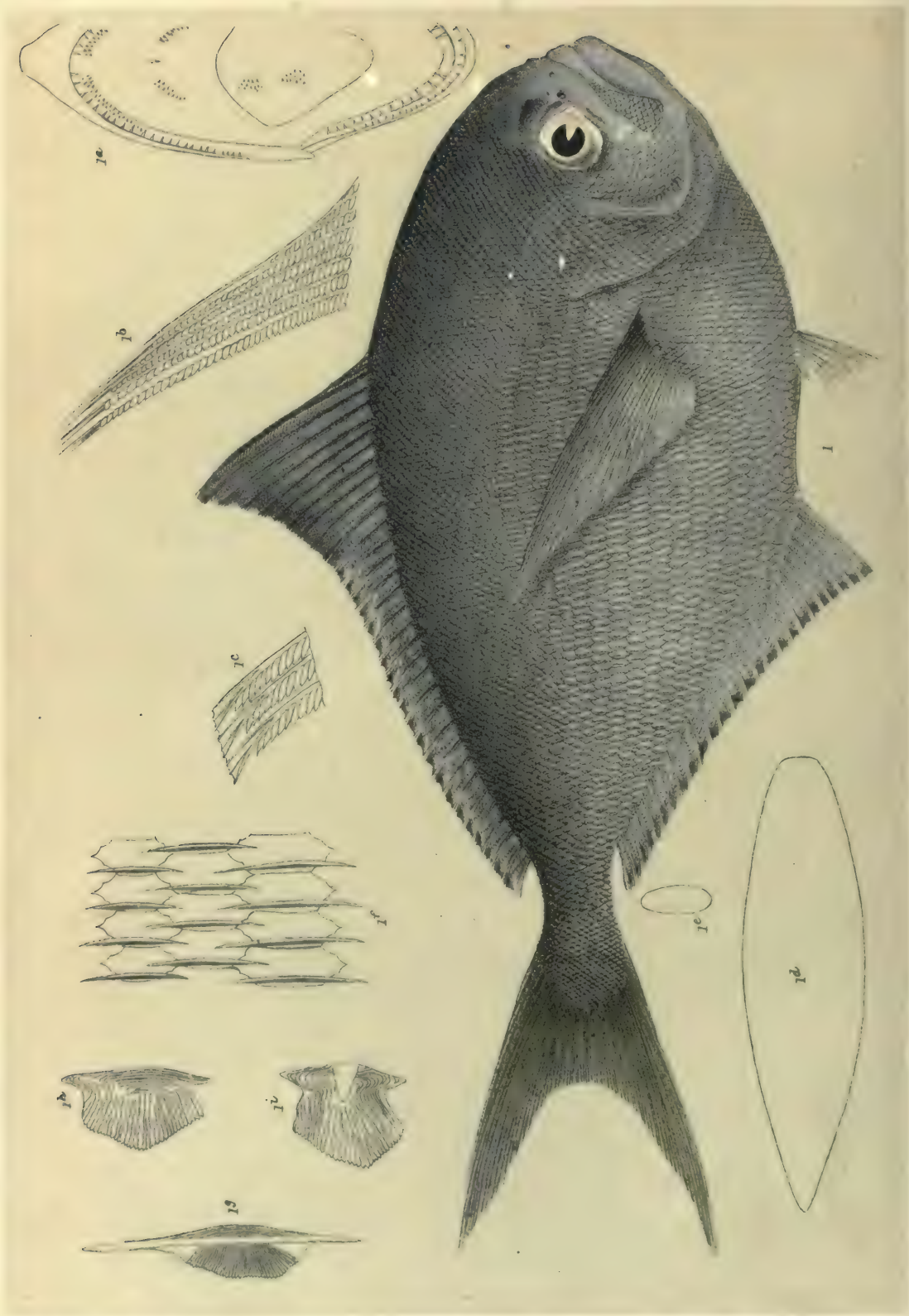
This species is abundant in the northern parts of the colony, found lurking under the deciduous bark of trees in the day time, the brownish or purplish-ashy mottlings almost exactly coinciding in appearance with the bark, rendering them very difficult of detection except for the brightness of the beautiful bronze eye. Some specimens have the transverse, dark marbling more distinct, and with the light color less broken, while others have the pattern more complex. The under-side is destitute of markings in all the specimens.

The specimen figured is from Echuca. Not figured of the color of life before.

EXPLANATION OF FIGURES.

PLATE 132.—Fig. 2, average specimen, natural size. Fig. 2*a*, side view of head, magnified two diameters. Fig. 2*b*, top view of head, magnified two diameters. Fig. 2*c*, front view of head, magnified two diameters, to show rostral, mental, and labial plates, and those between the nostrils. Fig. 2*d*, under view, showing scales of base of abdomen and tail, and under-side of hind legs, magnified two diameters. Fig. 2*e*, upper side of hind foot, magnified two diameters, to show upper scaling. Fig. 2*i*, upper side of anterior foot, magnified two diameters. Fig. 2*f*, under side of anterior foot, to show arrangement of scales with the double dilated pads at the tips, with the minute terminal joint between them. Fig. 2*g*, portion of one of the toes, magnified four diameters, to show the scales and plates near tip, viewed from below. Fig. 2*h*, ditto, viewed from above.

FREDERICK MCCOY.



A. Barthelemew del. et lith.

Prof. M'Coy direct.

Steam Litho. Govt. Printing Office

PLATE 133.

BRAMA RAYI (BLOCH).

RAY'S SEA BREAM.

[Genus BRAMA (SCHNIDER). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Family Scomberidæ. Sub-family Coryphœninæ.)

Gen. Char.—Body ovate, elevated, much compressed laterally; scales rather small; cleft of mouth very oblique, lower jaw longest; opercular pieces with smooth entire edges; seven branchiostegal rays; teeth large, conical, one outer row on both jaws, with a few rows of minute ones at base, a few, or none, on the vomer, and a patch of small ones on each palatine bone. Dorsal fin elongate, with three or four slender spines in front, and covered with small scales; anal like dorsal, with two or three slender spines in front; caudal deeply forked; ventrals small, under pectorals, of one slender spine and five branched rays; pectoral long, pointed. No swim-bladder; about five pyloric appendages.]

D. 3+38; A. 2 . 29; P. 19; V. 1+5; C. $\frac{1}{11}^{8}$; L.L. $94\frac{15}{28}$.

DESCRIPTION.—Greatest depth of body under origin of dorsal fin, equal to $\frac{1}{3}$ the total length including caudal fin; thickness about $\frac{1}{4}$ the height. *Head* short, about $\frac{1}{5}$ of total length and about $\frac{1}{5}$ higher than long, profile from front of dorsal fin to chin forming a parabolic curve; cleft of mouth extending obliquely upwards, ending at the vertical of anterior edge of eye; lower jaw longest, with a chin-like angle below the mouth; the curve of the head and nape and the less convex one of the throat to ventral fin intersecting at the chin nearly at right angles; orbits large, midway on a vertical line from top of head to lower edge of suboperculum. *Teeth:* There are no teeth on the vomer in some specimens and 1 or 3 in others; none on the smooth fleshy tongue; one row of large, conical teeth on edge of upper jaw, with a band of small ones within; two rows of conical teeth, with a narrow band of minute ones between them, on the under jaw, the inner row largest and hooked inwards; an oblong patch of 7 or 8 small hooked teeth on each palatine bone. Gill-openings extending to middle of lower jaw at throat, their membranes there uniting and covered by a fold of skin. *Fins:* Dorsal falcately lengthened in front, posterior two-thirds low, of 3 slender spines lodged in the front edge, and 38 branched rays, covered with small scales; anal smaller than and originating a little behind the dorsal, falcately lengthened in front, hinder three-fourths low, of 2 small, slender spines in front edge and 29 branched rays, the second and third longest, rapidly shortening to the ninth, all covered with scales; pectorals long, falcately pointed, about one-third of the height above ventral edge, reaching to middle of anal, of 19 rays, the sixth and seventh longest; ventrals small, of 1 slender spine, half the length of the others, and 5 branched rays; caudal deeply forked, of about 23 rays, those of the pointed lobes nearly four times as long as those of middle. *Scales:* Absent on front of snout and margins of preoperculum, on all rest of body higher than long, semielliptical or oblong, with about four undulations in posterior margin, which is finely serrated by the ends of very fine rough thread-like radiating striæ; lateral line indistinctly marked, of 94 scales, running parallel with back at one-fourth of the height from it, with about 8 small ones beyond on tail; 15 scales from front of dorsal to lateral line, and 28 from

lateral line to ventral edge, all finely striated, with thin, entire waved edges; exposed portion about middle of body below the lateral line semielliptical, nearly three times higher than long; anterior covered part forming a vertically elongate, thick, slender ridge acutely pointed above and below, greatest thickness in middle rather less than the length of the exposed part, but the vertical extent of the anterior ridge more than double the vertical measurement of the exposed portion; scales of lateral line much smaller and with the length and height of the exposed portion more nearly equal, and the anterior ridge only extending in short angular points above and below the exposed portion, which is otherwise like the others. The anterior ridges of the scales produce distinct vertical ridges on the body. *Color:* Whole body, head, and vertical fins lead-grey with lustre of lead, darker or blacker with brownish tinge on back and fins; hind portions of pectoral and ventral fins nearly colorless, with a slight yellowish tinge; iris brownish or yellowish above and in front, blackish below and behind.

MEASUREMENTS.

	Ft.	ins.	lines.
Length from tip of lower jaw to end of lobe of caudal ...	1	3	0
Depth of body	0	5	0
Thickness of body	0	1	6
Length of head from chin to edge of gill-cover	0	3	0
„ of posterior edge of orbit to edge of gill-cover ...	0	1	4
Diameter of eye	0	0	9
Length from bottom of orbit to lower edge of suboperculum ...	0	1	7
„ „ upper edge of orbit to back line of top of head ...	0	1	0
„ of pectoral	0	3	3
„ of ventral	0	1	1
„ of highest ray of dorsal	0	2	3
Height of middle of dorsal	0	0	8
Length of dorsal	0	6	4
„ of lobes of caudal	0	3	7
„ of middle of caudal	0	1	0
„ of anal	0	5	0
„ of longest ray of anal	0	1	8
„ of middle rays of anal	0	0	8
„ of exposed portion of largest scales about middle of body below lateral line	0	0	1½
Vertical extent of ditto	0	0	5
„ „ of anterior ridge	0	0	11
Longitudinal greatest measure of ditto	0	0	1
Length of exposed part of scales of lateral line	0	0	1½
Vertical extent of ditto	0	0	2
„ „ of anterior ridge	0	0	3

Four scales in a length of ½ in. at middle of body; about two of the rounded radiated portion of scales in the same vertical distance, but spinous ends of the thick vertical ridges extend farther.

REFERENCE.—Bloch and Schn., p. 99; Cuv. and Val., Hist. Poiss., v. 7, p. 281, t. 190.

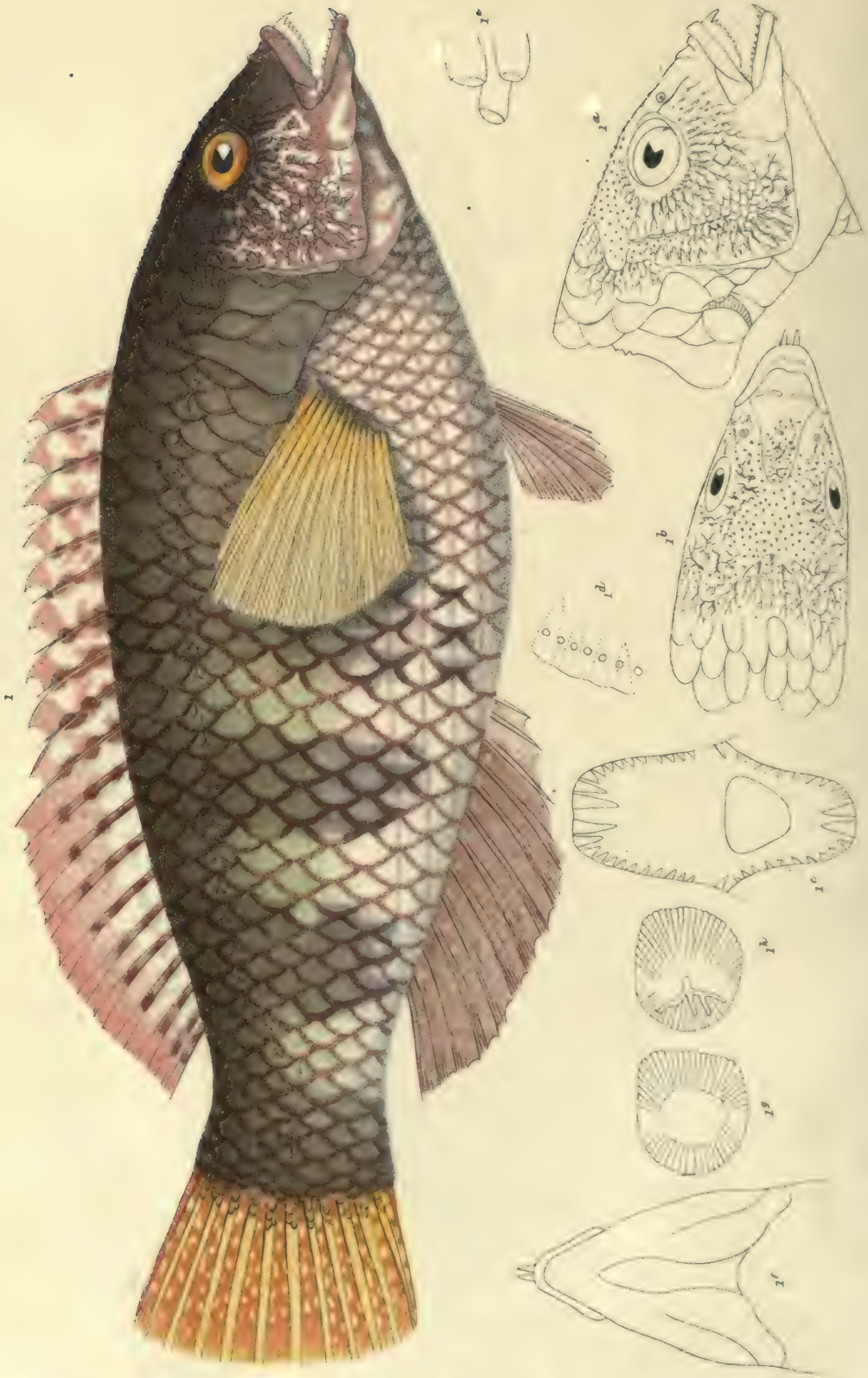
This remarkable fish appeared at Portland in considerable number in April 1884, being previously unknown to the fishermen, and has not been, as yet, seen on any other part of the Victorian coast, although noted by Count Castlenau at Sydney. I see no difference between our specimens and the European ones. This is considered one of the most delicious fishes for the table, of the

Mediterranean, and the readiness with which the gourmets of Victoria recognise this quality in so unusual a visitor to our shores is rather amusing, most pressing letters requiring the name of this god-send arriving by every post for some time afterwards.

Explanation of Figures.

Plate 133.—Fig. 1, side view of specimen, one-half the natural size. Fig. 1*a*, interior of mouth, showing teeth on upper and lower jaws and palate, and single one on vomer, natural size. Fig. 1*b*, anterior portion of dorsal fin, natural size, showing the rows of scales. Fig. 1*c*, natural size of lower portion of dorsal. Fig. 1*d*, form of section of body at base of pectoral. Fig. 1*e*, form of section of tail. Fig. 1*f*, portion of scaling of body, twice the natural size, to show the vertical ridges. Fig. 1*g*, scale from below lateral line, magnified two diameters, to show the very long, spinose vertical ridge. Fig. 1*h*, scales from above lateral line, magnified four diameters, showing the shorter vertical extension of ridges. Fig. 1*i*, scale from lateral line, magnified four diameters.

Frederick McCoy.



A. Bartholomew del. et lith.

Prof. McCoy direct.

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PLATE 134.

LABRICHTHYS BLEEKERI (CAST.).

BLEEKER'S PARROT-FISH.

[Genus LABRICHTHYS (BLEEKER). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Sub-order Pharyngognathi. Family Labridæ.)

Gen. Char.—Body moderately compressed, oblong; snout narrow, projecting; scales large; operculum scaly; cheeks more or less scaly; preoperculum not serrated. Lateral line continuous. Teeth sharp, conical, in 1 or 2 rows in upper jaw; usually 1 or 2 large canine teeth on each side in front, and often a large, conical, posterior canine tooth at angle of mouth in upper jaw. Fins, 9 spinous and 10 or 11 branched rays in dorsal, and 3 spinous and 10 branched in anal. Pacific and Indian Archipelago.]

D. 9 + 10; V. 1 + 5; A. 3 + 10; P. 13; C. 14; L.L. $26\frac{4}{10}$.

DESCRIPTION.—Body ovate, greatest depth a little in front of middle, moderately compressed; depth about $3\frac{1}{3}$ in total length, including caudal. Head moderate, about $3\frac{2}{3}$ in total length; cheeks with radiating, branched ridges behind and below the eye, and coarsely granulated above and in front of eye, with a vertical curved patch of scales rather nearer the edge of the preoperculum than the eye, large, tubular, and in 1 row above, smaller, simple, and in 2 and 3 rows below; 3 imperfect rows of large, rounded scales on the operculum; gill-opening large, curved; smooth, rounded lobe of operculum nearly quadrate and almost touching upper edge of pectoral fin. *Teeth:* a series of 12 conical teeth above, and 11 below, diminishing from the front canines, which are much the largest; with or without a posterior upper canine at corner of mouth; a row of much smaller and blunter teeth inside the outer row. *Scales:* of body large, not extending on dorsal fin; those of lateral line 26, branching tubules smooth, very irregular, the branches varying from 2, or more frequently 3, to the most frequent number 4, descending abruptly at the 20th (which is under the last ray of dorsal fin), the width of 1 scale, the 5 last scales running to a little above middle of caudal fin, on which are from 3 to 6 smaller, simple scales, forming short rows between the rays; there are 4 rows of scales above and 10 below the lateral line at middle of body. *Fins:* Spinous part of dorsal of 9 spines, shorter than the 10 branched rays, which increase to the 5th, and then decrease to the end, so that the last ray is twice its length from the caudal; caudal sub-truncate, obtusely rounded, of 14 rays; anal terminating slightly in front of dorsal; ventral of 1 spine and 5 branched rays, sub-rhombic or sub-ovate, not prolonged into a slender point; pectoral large, rounded. *Color:* Ground color of back and sides olive-green (darkest on back and on 3 or 4 imperfect, vertical bands, one at base of tail, one at end of dorsal and anal fins, one in front of middle of those fins, and one extending from posterior end of spinous dorsal on to head), and whitish pale blue below; posterior margin of each scale edged with dull carmine-red; top of head dark reddish-olive; cheeks and throat dull red, marbled with irregular spots and vermicular marks of bluish-white; dorsal fin mottled irregularly with pale clouds of green and reddish; rays reddish, with three irregular rows of dull, purple, cloudy spots; the soft dorsal with a broad margin of pale red; caudal with greenish-yellow membrane and orange rays, irregularly variegated with one or two rows of red spots; anal dull red, with four rows of round green spots on the membrane (in one specimen the fin is green, and spots red); ventrals pale red; pectorals with brilliant chrome-yellow rays and pale greenish-yellow membrane; iris with irregular, imperfect circles of green, white, and orange.

Measurements.	Ins.	lines.
Length from tip of snout to end of caudal	8	4
" " " anterior edge of eye	0	8
" " " posterior edge of eye	1	1
" " " end of operculum	2	3
" " " base of pectoral	2	2
" " " base of caudal	7	2
" " " 1st dorsal spine	2	3
" " " last dorsal ray	5	11
" " " base of ventrals	2	7
" " " 1st anal spine	4	3
" of pectoral	1	6
" of ventral	1	1

REFERENCE.—Proc. Zool. and Acc. Soc. Vict., v. 1, p. 148.

Like all of the genus, this beautiful Wrasse varies somewhat in color, the anal fin particularly being as often green with red spots, as like our figured specimen—dull red with green spots. The pearly-white mottling of the cheeks is most characteristic, as well as the red edging to the body scales. It is obvious that too much importance has been given to the posterior canine tooth by systematic writers, as one side of the mouth of the figured specimen has no trace of one, while the other has it well developed. In the upper jaw the inner row of small blunt teeth is of about 17, the longer pointed teeth of outer row 12, with one large solitary one at corner of mouth. There are about 11 pointed conical teeth on each side of lower jaw in a single row. The branching of the tubules of the lateral line is most unusually irregular in number of the branches; they are smooth, and without pores on the surface.

This species, like the other Parrot-fishes, may be seen occasionally in the fish-shops in April, May, and June, as beautiful curiosities rather than for sale for the table, the flesh not being generally esteemed. Small crustacea are found in the stomach, and obviously constitute the usual food.

This fish has not been figured before.

EXPLANATION OF FIGURES.

PLATE 134.—Fig. 1, average specimen, natural size. Fig. 1*a*, side of head in outline, to show three rows of cheek scales below, the radiating branched ridges, and the granules. Fig. 1*b*, top of head, to show granules. Fig. 1*c*, outer row of teeth, magnified two diameters. Fig. 1*d*, outer row of teeth dotted, showing relative position of smaller, blunt teeth of inner row, magnified four diameters. Fig. 1*e*, some of upper cheek scales, magnified, to show tubular posterior margin. Fig. 1*f*, outline of under-side of head, showing the relation of the sub-opercula and form of isthmus. Fig. 1*g*, scale of back, magnified one and a half diameters. Fig. 1*h* scale from lateral line with greatest number of branches, magnified one and a half diameters.

FREDERICK MCCOY.

PLATE 135, FIG. 1.

HEMIRAMPHUS INTERMEDIUS (CANT.).

THE BLACK-FINNED HALF-BEAK OR SEA GAR-FISH.

[Genus HEMIRAMPHUS (CUV.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Physostomi. Family Scomberesocidæ.)

Gen. Char.—Body elongate, slender, compressed. Head elongate; upper jaw short, triangular, convex above, formed of the inter-maxillaries in the middle and the maxillaries at the sides; lower jaw prolonged beyond the upper in a long slender beak, with a flexible termination representing the lips (lower jaw short in very young individuals); lower pharyngeals united into a single bone; gill-opening very wide. Teeth very minute, in a band of several rows on upper jaw and corresponding portion of base of lower jaw. Scales moderately large, rounded, with a row of much smaller, strongly carinated ones, forming a keel along each side near the ventral margin. Dorsal fin single, opposite the anal fin, and equal to it; no finlets; caudal usually moderately forked, with the lower lobe largest; pectorals moderate, semioval; ventrals small, near middle of ventral margin. Stomach and intestine straight. No pyloric appendages. Air-bladder large, without pneumatic duct.]

D. 16 to 17; P. 12 to 13; V. 6; A. 18 to 19; C. $\frac{2}{2}\frac{2}{3}$. Scales 52 to 56, from head to tail.

DESCRIPTION.—Length of head from tip of beak to edge of operculum slightly less than one-third of the total length to base of caudal. Length of lower jaw beyond tip of upper one slightly more than half the length of head, $5\frac{1}{8}$ in total length to base of caudal. Length and width of movable portion of upper jaw nearly equal. Top of head slightly convex; diameter of orbit less than inter-orbital space, and $1\frac{2}{3}$ in the length of post-orbital part of head. Pre-orbital plate about as long as high. Middle of back flattened, very slightly convex. Base of ventrals half way between base of caudal and base of pectoral. Teeth in both jaws minute, tricuspid. *Color:* Back pale olive-green, darkest on top of head and towards tail from front of dorsal to caudal fin; terminal portion of lower jaw flesh-red; a broad, distinct, silvery stripe from top of base of pectoral to middle of base of caudal, having a blue, or emerald-green, or, in some lights, yellowish stripe above it. Sides below the silver band pearly, very pale green, with opaline reflections of blue and pink fading to nearly white on midline of belly and throat. Cheeks and opercular pieces brilliant silvery, with opaline blue, green, and pink reflections. Iris silvery, with green and bronze reflections. Pectoral fins dusky or blackish, darkest towards the tip, from crowded, minute, black dots. Ventral nearly colorless, the rays minutely dotted with black. Dorsal and anal fins very pale olive. Caudal brownish-olive, with blackish margin. *Measurements:* Length of average specimen, from tip of lower jaw to tip of caudal, 1 ft. 4 ins. Proportional measurements: tip of snout to tip of upper jaw, $\frac{15\frac{1}{2}}{100}$; to gape, $\frac{18}{100}$; to anterior edge of orbit, $\frac{20\frac{1}{2}}{100}$; to posterior edge of orbit, $\frac{24}{100}$; to posterior edge of operculum, $\frac{30}{100}$; to base of pectoral, $\frac{32}{100}$; to tip of pectoral, $\frac{40}{100}$; to base of ventral, $\frac{62}{100}$; to tip of ventral, $\frac{66}{100}$; to front edge of dorsal, $\frac{74}{100}$; to hind edge of dorsal, $\frac{85}{100}$; to front edge of anal, $\frac{75}{100}$; to hind edge of anal, $\frac{85}{100}$; to base of caudal, $\frac{90}{100}$; to middle edge of caudal, $\frac{98}{100}$; greatest depth at middle, $\frac{10}{100}$; greatest thickness, $\frac{8}{100}$; height of dorsal, $\frac{7}{100}$; depth of anal, $\frac{7}{100}$; space between orbits, $\frac{4}{100}$; diameter of orbit, $\frac{3\frac{1}{2}}{100}$; width of base of upper jaw, $\frac{4}{100}$; length of base of upper jaw, $\frac{4}{100}$.

REFERENCE.—Cant. An. & Mag. Nat. Hist., 1842, v. 9, p. 485=*H. melanochir*, Cuv. & Val., Hist. Nat. des Poiss., v. 19, p. 41.

This species has the ova exuding in the middle of October, which must be the spawning time. The ova are larger than those of the *H. regularis* of the Lakes. It is the common Sea Gar-fish of the fishermen and fish-dealers supplying Melbourne, and is easily distinguished from the fresh-water species of the Gippsland Lakes, *H. regularis* (Günt.), by the blackish pectoral fins, suggesting the excellent specific name, *H. melanochir*, given to it by Cuvier, as well as by the more posterior position of the ventral fins and the long movable upper jaw.

EXPLANATION OF FIGURES.

PLATE 135.—Fig. 1, side view of specimen, $\frac{1}{8}$ natural size. Fig. 1*a*, top view of head and snout, $\frac{1}{8}$ natural size, to show the flexible membranous borders and tip of lower jaw beyond upper jaw. Fig. 1*b*, top view of portion of lower jaw, magnified four diameters. Fig. 1*c*, mouth, to show rows of teeth in upper and lower jaws, magnified. Fig. 1*d*, tricuspid teeth of upper and lower jaws, magnified sixteen diameters. Fig. 1*e*, scale below lateral line at middle of body, magnified three diameters. Fig. 1*f*, scale above lateral line, magnified three diameters. Fig. 1*g*, scale from abdominal ridge, magnified three diameters.

PLATE 135, FIG. 2.

SCOMBERESOX SAURUS (BLOCH SP.), VAR. FORSTERI. (CUV. AND VAL.).

THE SAURY PIKE.

[Genus SCOMBERESOX (LACÉP.). (Sub-kingdom Vertebrata Class Pisces. Sub-class Teleostei. Order Physostomi. Family Scomberesocidæ.)

Gen. Char.—Body elongate, slender, compressed. Head prolonged into two long, very slender jaws, with a slight upward curvature, the upper formed of the inter-maxillary bones, the lower beak a little longer than the upper; both jaws bordered with a row of very minute, simple teeth, none on the tongue nor palate. Scales small, thin, deciduous on body; a row of keeled scales on each side of lower edge of belly; lateral line very obscure, from upper end of operculum to middle of tail. One dorsal opposite one similar anal fin, set far back, with a series of small detached finlets between the dorsal and anal fins and the tail; caudal fin deeply forked. Air-bladder present or absent, without duct. Stomach and intestines forming one straight alimentary canal, without pyloric appendages. Lower pharyngeals united in one bone. Nostrils in a triangular pit in front of eye. Pseudobranchiæ glandular, obscure. Gill-opening very wide.]

D. 10 to 11; P. 12; V. 6; A. 11 to 12; Finlets $\frac{6}{7}$; C. 20 to 30; L.L. about 110.

DESCRIPTION.—Length of head two-sevenths of total length, including caudal fin. Greatest depth of body (about middle), 11 times in total length from tip of

lower beak to end of upper lobe of caudal; depth at base of pectoral equal to depth in front of dorsal and anal fins; depth of tail between last finlet and caudal, $4\frac{1}{2}$ times in greatest depth at middle of body; beak nearly straight, very slender; beak of lower jaw from angle of commissure less than the rest of the head to edge of operculum, broader than deep, tip soft and flexible, $7\frac{1}{3}$ times in total length to tip of caudal; upper beak more slender than, and fitting in a groove in, the lower one, of which it is $\frac{6}{7}$ the length; sub-orbital plate sub-quadrate, with a shallow sinus in the oblique front edge; a small, deep, narrow notch below the nostril, and produced backwards in a narrow posterior angle as far as first third of diameter of eye. Base of ventral half way between base of caudal and anterior margin of orbit; diameter of eye about $2\frac{2}{3}$ in post-orbital portion of head. Diameter of eye about 5 times in length of cheek from end of gape to edge of operculum, a slight mucous swelling in front, with a row of mucous pores; another row of pores along lower edge of preoperculum, and another row from top of orbit to the shoulder. Lower jaws, and also the edges of the opercular plates, nearly touching under the throat, from the narrowness of the isthmus; branchiostegal membrane hid under the opercular plates. Six finlets above and seven below, the anterior one slightly smaller than the second, and connected by membrane with the dorsal and anal fins; the row of keeled scales along belly ends at fourth lower finlet. *Color:* Dark blue on back, with slight greenish reflections; sides, belly, opercular plates, and cheeks below the eye brilliant silvery-white; caudal fin and upper finlets blue; other fins paler. Iris silvery. *Measurements:* Total length from tip of beak to lower lobe of caudal, 12 to 15 inches. Proportional measurements to 12 ins. as 100: Tip of lower beak to tip of upper one, $\frac{8}{100}$; to gape, $\frac{13}{100}$; to front edge of orbit, $\frac{17}{100}$; to hind edge of orbit, $\frac{20}{100}$; to upper base of pectoral, or end of operculum, $\frac{27}{100}$; to base of ventrals, $\frac{56}{100}$; to base of anal, $\frac{70}{100}$; greatest depth of body, $\frac{9}{100}$; greatest thickness of body, $\frac{5}{100}$; length of pectorals, $\frac{6}{100}$; length of ventrals, $\frac{5}{100}$; length of upper lobe of caudal, $\frac{7}{100}$; length of lower lobe of caudal, $\frac{3}{100}$; length of middle rays of caudal, $\frac{2}{100}$. Seven scales in a length of $\frac{1}{2}$ in. at middle of body; 12 keeled scales in same length at middle of abdominal row.

REFERENCE.—*Esox saurus*, Bloch & Schn., p. 394, t. 78 = *Scomberesox Camperi*, Lacép., v. p. 345; Cuv. & Val. Hist. Nat. des Poissons, v. xviii., p. 464, t. 551 ? = *Scomberesox Forsteri*, Cuv. & Val., v. xviii., p. 481.

The upper beak is longer in proportion to the lower than in the *S. Camperi*, in which it is represented by Cuvier and Valenciennes to be only three-fourths of the length of the lower; but I, unfortunately, have no European specimen to make sure of this character or of the size of the scales, which, Dr. Günther thinks, may distinguish the northern species, but he does not give the size for the *S. saurus* or *Camperi* of Northern waters, as I do here for the Australian fish. The sub-orbital plate in front of and below the nostril is smaller, more upright, and with a more distinct sinus in the front margin than in the *S. Camperi*, as figured and described by Cuvier and Valenciennes, the front margin being less oblique, but, like it, has a deep, narrow, vertical slit below the nostril.

Although the species of *Scomberesox*, like the Mackerel, have finlets between the dorsal and anal fins and the tail, they have no adipose eye-lid. Like the Mackerel also, species of this genus, almost undistinguishable externally, really differ by the presence or absence of the swim-bladder; the English and Mediterranean Mackerel differing in this respect, as the present *Scomberesox* and the Atlantic specimens differ from the Mediterranean one, by having a swim-bladder, which does not exist in the latter. The swim-bladder is very distinct in our species.

I greatly doubt the distinctness of this species or variety from *S. saurus*, but am not sure of the amount of variation in the relative lengths of the jaws in the latter; Cuvier figuring and describing the upper jaw as considerably shorter, but praising the accuracy of Donovan's figure of an English example, which has the jaws as nearly equal as ours. I find about the same number of scales as Dr. Günther attributes to *S. saurus* in the longitudinal lines from head to tail, so that his suggestion that *S. Forsteri* may have smaller scales does not, I think, stand as a distinction between the species.

Three specimens in the Museum were caught in Hobson's Bay in April.

EXPLANATION OF FIGURES.

PLATE 135.—Fig. 2, side view of specimen, three-fourths the natural size. Fig. 2*a*, side view of head, seven-eighths natural size, to show form of plates and rows of mucous pores. Fig. 2*b*, head, viewed from above, showing the lower jaw extending beyond the upper at sides and tip. Fig. 2*c*, interior of lower jaw, showing rows of teeth on side, and transverse horny ridges on middle. Fig. 2*d*, scale of body, magnified. Figs. 2*e*, 2*f*, 2*g*, scales of abdominal keels, magnified.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Polyzoa)

Steam Litho Govt. Printing Office

PLATE 136, FIG. 1.

CABEREA RUDIS (BUSK).

[Genus CABEREA (LAMX). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellulariidæ.)

Gen. Char.—Zoarium continuous, or imperfectly jointed, dichotomously branched. Zoœcia bi-multiserial, quadrate; an avicularium on the outer side of the lateral, and one or two at the base of the internal zoœcia. Vibracula large, situated at the back of the branches, biserial, each common to several zoœcia.]

DESCRIPTION.—Zoarium with the branches broad, about one-eighth of an inch, strap-shaped. Zoœcia multiserial; membranous aperture large, elliptical; three large spines articulated at the upper and outer and one at the inner angle of the lateral zoœcia; one or two on each angle of the inner zoœcia; a stout anvil-shaped scutum with a thick peduncle overarching the aperture. Oœcia flat, mitriform, with a thickened margin. In the central zoœcia two slightly raised avicularia, with triangular mandibles pointing upwards, on the lamina below the aperture; on the lateral zoœcia a single large avicularium, narrowed below and expanded above, with a thickened margin and stout beak to the rostrum, and a long, triangular, pointed mandible directed horizontally outwards. Posterior surface flat, outline of zoœcia diamond-shaped, longitudinally sulcate. Vibracular setæ short, slender, slightly serrated, the vibracular cells narrow, and not obscuring the posterior outlines of the zoœcia. Radical fibres springing from the bases of the zoœcia, uniting to form a lateral bundle.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Pol., pt. i., p. 37, pl. xlvi.

Port Phillip Heads; Portland, Mr. Maplestone.

Forms tufts, of a dirty white color, attaining a height of two inches or more. It is readily distinguished by the large lateral avicularia, which are frequently of enormous size, and by the small size of the vibracular cells, not obscuring the posterior outlines of the zoœcia, with the short slender setæ.

EXPLANATION OF FIGURES.

PLATE 136.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of anterior surface, magnified showing, on one side, the lateral avicularia of enormous size. Fig. 1*b*, posterior view of same, showing the outlines of zoœcia, vibracular cells, and radical fibres.

PLATE 136, FIG. 2.

CABEREA GRANDIS (HINCKS).

DESCRIPTION.—Zoarium with the branches rather broad, strap-shaped. Zoœcia multiserial; membranous aperture large, elliptical or oblong; two spines on the outer and one on the inner angle of the marginal zoœcia, and one on each angle of the

central; a spatulate or clavate scutum with thick peduncle, usually of small size. Oœcia flat, mitriform, with a thickened rim. One or two avicularia at the base of each central zoœcium, with the mandible usually directed upwards; on the lateral zoœcia a very small avicularium, with the mandible placed transversely, on a long, narrow process united throughout to the cell; on various parts of the zoarium occasionally intercalated avicularia of enormous size. Posterior surface of the zoœcia entirely obscured by the vibracular cells, which are distinct, almond-shaped, those of opposite sides meeting in a groove in the centre of the branch; setæ long and serrated. No radical tubes.

Reference.—Hincks, Ann. and Mag. Nat. Hist., July 1881.

Port Phillip Heads.

This species, which attains a height of an inch or more, is readily distinguished from the other multiserial species by the small lateral avicularia, the projection of the vibracular cells beyond the margins of the branches, so as to be visible from the front, and their completely obscuring the posterior surface of the zoœcia. The size and disposition of the vibracular cells, with the long serrated setæ, and the deep groove between the rows, make a striking resemblance to a miniature head of barley. The large avicularia are not frequent, being absent in many specimens. The oral spines, also, are by no means constantly seen, either from being absent or worn off.

Explanation of Figures.

Plate 136.—Fig. 2, specimen, natural size. Fig. 2*a*, anterior surface of portion of same, magnified; two large avicularia are shown, one of great size. Fig. 2*b*, posterior view of the same.

Plate 136, Fig. 3.

CANDA ARACHNOIDES (Lamx.).

[Genus CANDA (Lamx.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellulariidæ.)

Gen. Char.—Zoarium dichotomously branched, branches biserial, connected by transverse chitinous tubes attached at either end to a vibraculum. Avicularia large, situated on a special tract on the front of the branches between the rows of zoœcia. Each zoœcium with a vibraculum posteriorly.]

Description.—Branches rather broad; zoœcia quadrate, a spine at each upper angle, of which that on the outer is the larger; margin thickened, crenulated; aperture elliptical, the lamina smooth or finely granular. Avicularia with the mandibles broadly triangular. Posteriorly the zoœcia elongated, wider in upper half, separated by thick, raised lines. The vibracular groove not extending beyond the median line; setæ short, smooth. Connecting tubes stout.

Reference.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 26, pl. xxxiii.; Busk, *Challenger* Polyzoa, p. 25.

Port Phillip Heads; Portland, Mr. Maplestone.

Luxuriant specimens attain a height of about 3 inches. Each large branch divides dichotomously, the resulting ramification forming a flabelliform expansion. The various branches of each group are joined by transverse flexible tubes, which are attached at either end to vibracula. At the lower end of the branches, however, many, instead of connecting with other branches, attach the zoarium to the object on which it grows in the same manner as ordinary radical tubes. The avicularia are usually crowded, and of large size towards the growing extremities of the branches, being less frequent or wanting on the older. The mandible is broadly triangular, nearly equilateral. The vibracular groove does not extend beyond the cell with which the vibraculum is connected, and therefore does not cross the mesian line. I have not seen the oœcium; but Mr. Busk (*Challenger* Polyzoa, p. 25) describes it as "subglobose, crowned with a sessile avicularium, and having a broad elliptical membranous area in front."

EXPLANATION OF FIGURES.

PLATE 136.—Fig. 3, specimen, natural size. Fig. 3*a*, front view of portion of same, magnified. Fig. 3*b*, posterior view of same.

PLATE 136, FIG. 4.

CANDA TENUIS (McG.).

DESCRIPTION.—Branches very slender, straggling. Zoœcia elongated, a spine on each side above; margins thick and crenulated, lamina granular; aperture elliptical, occupying about two-thirds of the front. Avicularia with the mandible narrow and triangular. Vibracular groove extending beyond the median line. Connecting tubes long and slender.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads.

Readily distinguished from *C. arachnoides* by its much smaller size, more slender and straggling branches, which do not grow so much in one plane, narrower and more pointed avicularian

mandible, and especially by the vibracular grooves for the lodgment of the setæ extending across the median line on the surface of a cell of the other series.

EXPLANATION OF FIGURES.

PLATE 136.—Fig. 4, specimen, natural size. Fig. 4*a*, front view of portion of same, magnified. Fig 4*b*, back view of same.

The specimens and descriptions of *Caberea* and *Canda* on this plate have been given by Mr. MacGillivray for the National Museum collection and this work.

FREDERICK McCOY.

1d
1c
1b
1e
1
4
3
2a
2
6a
5
7a
7
6

PLATE 137, FIGS. 1 AND 5.

CABEREA DARWINII (BUSK).

[Genus CABEREA (LAMX.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellulariidæ.)

Gen. Char.—Zoarium continuous, or imperfectly jointed, dichotomously branched. Zoœcia bi-multiserial, quadrate. An avicularium on the outer side of the lateral, and one or two at the base of the internal zoœcia. Vibracula large, situated at the back of the branches, biserial, each common to several zoœcia.]

DESCRIPTION. — Zoarium flabelliform. Zoœcia biserial, elongated, narrowed downwards; area large, filled in by a granulated expansion with a thickened crenulated margin; aperture elliptical, almost entirely (except the part occupied by the mouth) covered by the scutum, which has a peculiar helicine mark; two articulated spines at the upper and outer angle, and usually one, as well as a peduncular one, from the inner angle. A small avicularium on the outside of each lateral zoœcium on a narrow prominence; a sessile avicularium at the base of each peduncular spine, with the bluntly triangular mandible pointed downwards; occasionally a small avicularium, with triangular mandible directed upwards, situated between two zoœcia. Oœcia smooth in young specimens, with a marginal rim in older. Posteriorly the vibracula are much elongated, spindle-shaped, with long serrated setæ. Radical tubes numerous, springing from the lower part of the zoœcia, and converging to form a ridge down the back of the branches.

REFERENCE.—Busk, *Challenger* Polyzoa, p. 29.

Port Phillip Heads ; Portland, Mr. Maplestone.

In the *Challenger* Polyzoa, Mr. Busk describes and figures a form from New Zealand under the name of *C. Darwinii*, which he says is identical with that described in the British Museum Catalogue as *C. Boryi* and figured as *C. Patagonica*. It is not uncommon here, and I quite agree with Busk in considering it as distinct from the European species, with which it and the next have been generally confounded. It is characterised by the zoœcia being narrowed downwards, the lower part and sides of the area filled in by a granular layer, with the margin of the aperture finely crenulate. In perfect specimens, the scutum is of large size, nearly filling all the aperture, except that part corresponding to the mouth. It is nearly straight above, with frequently a small process or spur projecting upwards, and the large downwardly expanded lamina has a peculiar helicine mark. Busk describes and figures the scutum as plain ; but there can be no doubt of the

identity of the species. In older specimens the edge of the lamina is usually worn off, and the appearance is then much altered, as in fig. 5. The oœcium when young has the edge smooth, but it gradually becomes surrounded by a thickened margin.

EXPLANATION OF FIGURES.

PLATE 137.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of same, magnified. Fig. 1*b*, two zoœcia of same, more highly magnified, showing the lateral and central avicularia and scutum. Fig. 1*c*, another portion of the same, showing an oœcium before the development of the marginal rim. Fig. 1*d*, portion of posterior surface, showing vibracula. Fig. 5, another older specimen, natural size. Fig. 5*a*, portion, magnified, showing the scutum worn and the oœcia with thick marginal rim.

PLATE 137, FIGS. 2, 3, AND 4.

CABEREA GLABRA (McG.).

DESCRIPTION.—Zoarium expanded, flabelliform. Zoœcia biserial, slightly narrowed below, area partly filled in by a smooth plate; scutum with a thick peduncle, the mandible usually chiefly expanded downwards, reniform or hammer-shaped; two spines at the outer angle above, and one, frequently of enormous size, from the peduncle of the scutum. Lateral avicularia small; central avicularia large, irregularly placed above or below the peduncle. Zoœcia posteriorly elongated, smooth or faintly sulcate, vibracular setæ serrated. Oœcia rounded, arcuate or irregular, flattened in front with a thickened margin.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1885.

Port Phillip Heads.

This species differs from *C. Darwinii* in the smoothness of the lamina partly filling the area. It is closely allied to the European *C. Boryi*, in which the zoœcia are shorter and broader and have a thickened smooth band round the aperture. The peduncular spine is sometimes much hypertrophied, and I was at one time inclined to describe the form fig. 4 as a distinct species (*C. dolabrata*) characterised by the enormous size of these spines, and the form of the scutum extended to a sharp point above the peduncle and to a blunter end below.

EXPLANATION OF FIGURES.

PLATE 137.—Fig. 2, specimen, natural size; the branches are made too thick. Fig. 2*a*, portion of the same, magnified; the oœcia here have not yet developed a thickened rim. Fig. 3, portion of another specimen, magnified, showing a large peduncular spine and irregularly shaped oœcia. Fig. 4, portion of specimen of var. *dolabrata*, magnified, showing enormous peduncular spines and scutum forming a sharp process above.

PLATE 137, FIG. 6.

ÆTEA DILATATA (BUSK).

[Genus ÆTEA (LAMX.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Æteidæ.)

Gen. Char.—Zoœcia arising from a creeping or partially free stolon, calcareous, tubular, with a subterminal membranous area. No avicularia or oœcia.]

DESCRIPTION.—Extremity cyathiform, with a subcircular membranous area; tube finely ringed, dilated portion minutely punctate.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 30, pl. xv., figs. 2, 3.

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EXPLANATION OF FIGURES.

PLATE 137.—Fig. 6, small alga overrun by this species, natural size. Fig. 6*a*, three zoœcia and stolon, magnified. The tubular portions of the stolon between the enlargements are usually much longer than in the figure.

PLATE 137, FIG. 7.

ÆTEA ANGUINA (LINN. SP.).

DESCRIPTION.—Extremity spatulate, with an elongated membranous area; tube finely ringed, spatulate portion minutely punctate.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, pt. i., p. 31, pl. xv., fig. 1.

Port Phillip Heads.

EXPLANATION OF FIGURES.

PLATE 137.—Fig. 7, specimen, natural size, covering a small alga. Fig. 7*a*, portion, magnified.

The specimens and descriptions of the Polyzoa on this plate are from Mr. MacGillivray.

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1
2
3
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5
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7
8
10a
10
9a

PLATE 138, FIG. 1.

SCHIZOPORELLA PUNCTIGERA (McG.).

[Genus SCHIZOPORELLA (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ.)
Gen. Char.—Zoarium encrusting, adnate, or erect, and uni- or bi-laminate. Zoœcia closely adherent to each other. Lower lip with a median notch.]

DESCRIPTION.—Zoœcia ovate or quadrate, arranged in linear, radiating series, smooth or more frequently minutely granular; mouth rounded above, nearly straight below, with a narrow, sharply defined sinus; 4–7 spines on the upper margin; a minute avicularium on an elevation below the mouth. Oœcia rounded, thickly punctate, and with a smooth rim.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads.

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 1, small group of zoœcia, showing also oœcia, magnified. In this specimen the surface of the zoœcia was almost quite smooth; it is usually finely granular, as in the next species.

PLATE 138, FIG. 2.

SCHIZOPORELLA LATA (McG.).

DESCRIPTION,—Zoœcia quadrate or oval, arranged in linear series; front slightly convex, granulo-punctured; mouth large, with a rather wide, shallow-pointed sinus in the lower lip; below the mouth a small elevation bearing a minute avicularium. Oœcia large, rounded, thickly punctate.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads.

These two species are very closely allied, but are readily distinguished by the sinus in the lower lip, which in *S. lata* is wide and rather shallow, while in *S. punctigera* it is narrow and sharply cut. Busk's *Challenger S. marsupiata* seems to be *S. lata*.

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 2, small portion of specimen, magnified.

PLATE 138, FIG. 3.

SCHIZOPORELLA TRIANGULA (HINCKS).

DESCRIPTION.—Zoœcia large, quadrate, flat, separated by slightly raised margins; surface roughly granular and frequently with minute perforations; mouth wide, slightly arched above, with a wide sinus in the lower lip, at each angle of which is a small articular process. A large sessile avicularium immediately below the mouth, with the long, narrow mandible pointed directly downwards.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., July 1881; Busk, *Challenger* Polyzoa, p. 167.

Port Phillip Heads.

This is a very marked species. The zoœcia are large, usually quadrate and arranged in radiating linear series, but sometimes oval and very irregular. The broad, shallow, sub-triangular mouth, and the large sub-oral avicularium with its long mandible directed straight downwards, are sufficiently distinctive. I have not seen the oœcia, which, according to Hincks and Busk, seem very peculiar. The description given by Mr. Hincks is—"Oœcium very large, covering almost the whole of the cell above it, rounded, often traversed by raised white lines, with one or more projecting pointed processes on each side in front, overhanging the opening, and opposite to them on the lower margin two (sometimes more) strong conical teeth; surface covered with large nodules and punctured; orifice of the ovicelligerous cells very large, elongated transversely, with a slightly sinuated lower margin."

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 3, small portion of specimen, magnified.

PLATE 138, FIG. 4.

SCHIZOPORELLA DÆDALA (McG.).

DESCRIPTION.—Zoœcia large, quincuncial, indistinct; surface deeply areolated; mouth semicircular, or rather higher than wide, nearly straight below, and with a deep, rounded sinus; four or five spines above. A very large avicularium on one or both sides, situated below and outside the mouth, with the mandible extending

obliquely upwards and outwards to nearly opposite the centre of the upper margin of the mouth of the zoœcium in the adjacent series. Oœcium mitriform, deeply imbedded in the zoœcium above, divided into two parts by a thick ridge parallel to the outer edge; the inner part nearly smooth, but areolated at the edges, the outer sloping and also areolated.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882; *S. controversa* (Waters), Hincks, Ann. and Mag. Nat. Hist.

All my specimens are in the Hemeschara form. Hincks describes it from a Victorian specimen, and refers it to Waters' fossil species, *S. controversa*, an identification with which I do not agree. My original name, *S. insignis*, having been shortly before given to an African form, I have substituted the specific name *dædala*. The mandible of the avicularium is sometimes narrower and more pointed, and also situated lower down, than in the specimen figured.

Explanation of Figure.

Plate 138.—Fig. 4, small portion, magnified, showing also an oœcium.

Plate 138, Fig. 5.

SCHIZOPORELLA SUBSINUATA (Hincks).

Description.—Zoarium loosely adnate or free. Zoœcia separated by narrow, raised lines, varying in shape, broad, convex; surface nodular and perforated; mouth with the margin thickened, and a shallow sinus in the lower lip. Oœcium large, rounded, nodular, and perforated. Avicularia rare, situated at the upper angle of the zoœcia, with the long, pointed mandible directed downwards and inwards.

Reference.—Hincks, Ann. and Mag. Nat. Hist., Oct. 1884.

Port Phillip Heads.

I have no doubt that this species is identical with the *S. subsinuata* of Hincks, although not altogether agreeing with his description or figure. The zoarium is loosely adnate; of a dark grey or purplish-grey color. The zoœcia are large, broad, convex, separated by distinct raised lines, irregular in shape and arrangement, frequently quadrate. The surface is, in my specimens, covered by a delicate, glistening epitheca, marked with dark lines and loops; beneath the epitheca the surface is nodular with perforations among the nodules. The oœcia are of large size, covered with the

epitheca, and marked in the same manner as the zoœcia. In a few of the zoœcia there is a single large avicularium situated at the upper angle.

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 5, portion of specimen, magnified; avicularia are shown in two of the zoœcia.

PLATE 138, FIGS. 6, 7.

SCHIZOPORELLA RIDLEYI (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia rhomboidal or elongated, in radiating linear series, separated by slightly raised margins; surface when young smooth, when older deeply areolated at the edges; mouth semicircular above, straight below, with a small rounded sinus. Below the mouth a small, vertical, elliptical avicularium on an elevated part of the zoœcium. Oœcium rounded.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Oct. 1882; *S. marsupium*, Ridley, Proc. Zool. Soc. Lond., Jan. 1881.

Port Phillip Heads.

In young specimens the mouth, with its semicircular upper margin and straight lower lip with rounded sinus, is well seen, as well as the small, elliptical, sub-oral avicularium, situated on the raised semilunar portion of the zoœcium. In older and more calcified zoœcia this raised portion frequently becomes so developed as to obscure the view of the mouth and avicularium; in these also there is usually a series of deep grooves converging from the margin to the raised sub-oral portion.

EXPLANATION OF FIGURES.

PLATE 138.—Fig. 6, group of young zoœcia, to show the form of the mouth and situation of sub-oral avicularium. Fig. 7, portion of an older specimen, showing the converging grooves and oœcia.

PLATE 138, FIG. 8.

SCHIZOPORELLA ARACHNOIDES (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia oval, distinct, convex, smooth; mouth arched above, with a deep, rounded sinus in the straight lower lip; a series of (usually) seven stiff spines, several of which, especially the lower, are situated at

a distance from the margin of the mouth. Oœcia rounded, smooth, the edge usually sculptured.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Oct. 1882.

Port Phillip Heads.

This very beautiful species is at once distinguished by the arrangement of the oral spines. The lowest on each side is situated below and to one side of the angle of the mouth, and several others are frequently situated at a little distance from the mouth margin. The edge of the oœcium is frequently sculptured as in *Microporella Malusii;* but it is as commonly quite plain.

EXPLANATION OF FIGURE.

PLATE 138.—Fig. 8, small portion, magnified, showing the arrangement of the oral spines, and an oœcium, which in this specimen has a sculptured edge.

PLATE 138, FIG. 9.

SCHIZOPORELLA CRYPTOSTOMA (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia indistinct; surface tubercular and glistening; mouth with a large sinus in the lower lip; 4–6 articulated spines on the margin, the lower on one or both sides frequently larger; a large conical process rising from the centre of the lower margin of the mouth, and almost entirely concealing the oral sinus. Oœcia large, rounded, prominent, shining, the surface smooth, or with faint, converging lines. Avicularia of two kinds, either small, broad, and situated on a calcareous eminence usually by the side of the mouth, or of great size, with a long, narrow, acute mandible, nearly equalling the zoœcium in length.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, Mr. J. B. Wilson.

At first sight this species has a striking resemblance to a *Rhynchopora*, especially *R. longirostris* of Hincks, the large avicularia of which are very similar. The formation of the oral process, however, is quite distinct. It is not an outgrowth from the side of the mouth, but is a process springing from the lower margin below the sinus.

EXPLANATION OF FIGURES.

PLATE 138.—Fig. 9, portion near the edge of the zoarium. Fig. 9*a*, another portion of the same specimen, showing the large avicularia.

PLATE 138, FIG. 10.

GEMELLIPORA STRIATULA (SMITT).

[Genus GEMELLIPORA (SMITT). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ.)

Gen. Char.—Zoarium crustaceous, or erect and ramose. Mouth horse-shoe-shaped or pyriform, with a prominent denticle on each side for the articulation of the operculum; the lower lip with a deep sinus.]

DESCRIPTION.—Zoarium encrusting. Zoœcia irregularly shaped, elongated, usually attenuated downwards or pyriform, arranged more or less in linear series, distinct, very slightly prominent; surface glassy, marked with irregular, mostly transverse, fine striæ, and thickly punctate with small white-bordered pores; mouth horse-shoe-shaped above, with a large wide sinus below; at the junction of the sinus and upper part there is a prominent, sharp denticle on each side for the articulation of the operculum; a small, broadly-oval avicularium on a separate punctured area above the mouth. Oœcium large, slightly elevated, adpressed to the cell above, punctate, and with an avicularium on the summit.

REFERENCE.—Smitt, Floridan Bryozoa, Part ii., p. 37; *Lepralia striatula*, P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads, on *Adeonella*, &c.

Forms thin silvery films on old zoaria of *Adeonellopsis mucronata*, *Australis*, and other calcareous polyzoa. Besides the small avicularia above the mouth and on the oœcia, there are occasionally others, precisely similar, situated at the summits of closed cells where there is no appearance of there ever having been an orifice. The special tracts in which the supra-oral avicularia are situated are evidently of the same nature as these closed cells.

EXPLANATION OF FIGURES.

PLATE 138.—Fig. 10, portion of specimen, magnified, showing two oœcia. Fig. 10*a*, portion of zoœcium, more highly magnified, to show the structure of the mouth.

The specimens and descriptions of the Polyzoa on this plate are from Mr. MacGillivray.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Insects)

F.T. Wild del. et lith. Prof. M.Coy direct. Steam Litho Govt. Printing Office

PLATE 139, FIGS. 1–4.

OPSOMALA SORDIDA (AUD. SERV.).

THE DUSKY FLAT-HORNED LOCUST.

[Genus OPSOMALA (AUD. SERV.). (Sub-kingdom Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Acrididæ.)

Gen. Char.—Head large, conoidal, front extended in a horizontal, thick, conical point between the antennæ; anterior face extending very obliquely backwards and downwards, with four slender longitudinal keels, two close together in the middle, arising between the antennæ; the other pair, one on each side, arising between the eye and antennæ; eyes very large, prominent, placed obliquely near the anterior top of the head, close to base of antennæ; ocelli three, one in middle between the two keels, and one on each side above the base of the antennæ in front of the eyes; antennæ nearly as long as head and thorax, of numerous (about 23) joints, ensiform, with flattened upper and lower sides, usually widening abruptly from the third joint, and tapering to the end. Prothorax indistinctly tricarinate, with three or four transverse sulci, narrow, rounded above, slightly compressed, rounded or obtusely angular behind; presternum with one strong acutely conical spine in the middle; mesosternum and metasternum very broad, flat, and smooth; elytra narrow, lanceolate, rounded at tip, usually longer than the abdomen; wings slightly shorter than the elytra. Abdomen large, unicarinate above; appendages small. Legs: anterior and middle pairs small; posterior ones longer than the body, with thickened femora, and two rows of spines on distal half of tibiæ; tarsi slender, last joint elongate; cushion between the claws large.]

DESCRIPTION.—*Female:* Head and prothorax rugged, with granules, irregularly arranged in longitudinal rows; mesial keel on head and prothorax small, slightly marked; lateral keels on prothorax indistinct; transverse sulci on thorax small, the two posterior reaching the lateral margin, the two anterior shorter; prothorax transversely rounded, with an obtuse mucro behind; antennæ flattened, of 23 joints. *Color:* Head, thorax, anterior four legs, and abdomen dull brown, with tinges of bluish-grey; face and antennæ grey; hinder thighs mottled grey and cream color externally, dark greyish-blue on inner side; hind tibiæ pale testaceous red on inner side, paler on outer side, with the two rows of spines nearly black. Tegmina moderately translucent, very pale brownish-grey, with brown veins and numerous irregular, ill-defined, quadrate spots of dull pale brown; wings colorless, or with tinge of bluish-grey towards inner angle, with fine brown veins; abdomen smooth, glossy, of a richer brown than the body, and with cloudy patches of grey on hinder segments; upper pair of ovarian plates granulated, light cream color, with a strong median keel ending in the dark, pointed extremity; lower pair smoother, punctated, bicuspid, points dark; appendages very small. Length from frontal conical point to end of abdomen, 2 ins. 5 lines. Comparative measurements to length, taken as 100: Head, $\frac{10}{100}$; prothorax, $\frac{18}{100}$; antennæ, $\frac{30}{100}$; tegmina, $\frac{74}{100}$; width of tegmina, $\frac{15}{100}$; length of wings, $\frac{63}{100}$; hind femur, $\frac{48}{100}$; hind tibiæ, $\frac{17}{100}$; hind tarsi, $\frac{12}{100}$. *Male:* Similar to female, but much smaller; the upward curved sub-anal plate very large; appendages moderately long. The spotting of the tegmina darker and more distinct. Length from frontal point to end of abdomen, 1 in. 4 lines; proportional length of head, $\frac{15}{100}$; prothorax, $\frac{23}{100}$; tegmina, $\frac{96}{100}$; hind thigh, $\frac{54}{100}$; antennæ, $\frac{40}{100}$. Pupæ, 1 in. 2 lines long, have the wings 2 lines long; no ocelli; and the surface of the abdomen very rough, with longitudinal branching vermicular ridges, granules, and puncta.

REFERENCE.—Audinet Serville, Orthop., p. 592.

These flat-horned Locusts differ from the typical *Œdipoda* in the width and flatness of the joints of the antennæ, and in the roundness of the prothorax, and the great, single, conical spine on the middle of the presternum between the bases of the anterior pair of legs. They are entirely solitary, never forming flocks or crowds of individuals, and having no perceptible migratory habits. One, or a male and female, found occasionally on low bushes or tee-tree scrub around Melbourne. The terminal abdominal plates and appendages of the male and female, the structure of the hind thigh and the tarsi, and the stridulating drum over the base of the hind legs, agree with the general characters of the family. The males have the hind tibiæ of the same reddish tinge on the inner side as in the females, although M. Audinet Serville thought not. Some specimens are greyer, and others more brown in general tint, which agrees exactly with old stems of the tee-tree (*Leptospermum*), on which they are often found.

This species, although common, has not been figured before.

EXPLANATION OF FIGURES.

PLATE 139.—Fig. 1, female, natural size, in flying position. Fig. 1*a*, front view of head, magnified two diameters, to show antennæ, eyes, and longitudinal ridges of face. Fig. 1*b*, side view of head and thorax, to show granulation and form and extent of transverse sulci, magnified two diameters. Fig. 1*c*, side view of plates at end of abdomen, magnified two diameters. Fig. 1*d*, same, viewed from above, showing four plates and small appendages, magnified two diameters. Fig. 1*e*, side view of tarsus, magnified two diameters. Fig. 1*f*, same, viewed from below. Fig. 1*g*, under-side of thorax, magnified two diameters. Fig. 2, female in walking position, viewed sideways, to show relative length of elytra and abdomen, natural size. Fig. 3, male, natural size, in flying position. Fig. 3*a*, side view of end of abdomen, magnified three diameters. Fig. 3*b*, same, viewed from above. Fig. 4, pupa, walking position, natural size.

PLATE 139, FIGS. 5–6.

MESOPS PEDESTRIS (ERICHSON).

THE PEDESTRIAN MID-EYED LOCUST.

[Genus MESOPS (AUD. SERV.). Sub-kingdom Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Acrididæ.)

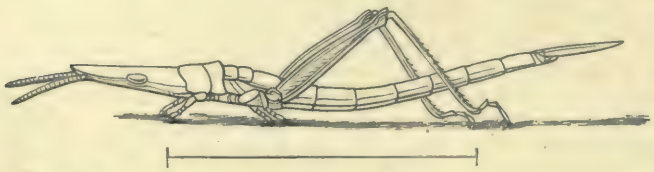
Gen. Char.—First and second pairs of feet very short; hind pair very large, with moderately elongate and swollen thighs, and with two rows of small spines on the middle and distal portion of upper surface of leg; tarsi slender, with a small cushion between the claws. Antennæ thick, moderately short, prismatic, of many wide joints. Head very long, conical, anterior face directed a little obliquely upwards and forwards from the horizontal.

Eyes moderately convex, placed far behind the antennæ and in front of prothorax, nearly in middle of side of head. Prothorax narrow, no wider than the head in front, short, semi-cylindrical, slightly keeled in the middle, without lateral keels. Presternum with a small conical spine between bases of anterior legs; mesosternum and metasternum narrow, widely channelled along middle. Elytra narrow, linear, only slightly opaque, shorter than abdomen (sometimes absent). Wings as long as the elytra (or sometimes absent). Abdomen very long, slender, cylindrical.]

DESCRIPTION.—Both sexes destitute of wings in the adult state, but with oblique lines on the sides of the mesothorax and metathorax, resembling the indications of wings in the pupæ of winged locusts. *Female:* Head, thorax, and abdomen moderately compressed, with a slightly marked keel from the tip of the snout to the sur-anal plate. Head, thorax, and abdomen minutely granular. Prothorax divided by a fine transverse sulcus a little behind the middle; metathorax divided similarly, a little in front of middle. Sub-anal plate less than half the length of the last normal joint of the abdomen, and projecting very slightly beyond the upper and lower pairs of plates. Lateral appendages very small. Antennæ flattened, 1st and 2nd joints narrow, 3rd and 4th joints widest; thence gradually tapering to the end. A prominent ridge extends from front of eye to tip of snout. First and second pairs of feet very small. A swollen tympanum at inner side of distal end of hind femora. Two rows of minute spines on upper surface of distal two-thirds of hind tarsi. Outer side of thighs convex, granular, with an upper keel and a lower, one bordered by a groove, on each side. Under side of head angularly keeled from tip of snout nearly to mouth. *Male:* Differing from female in much smaller size and in having a very long, compressed, sharp-pointed sub-anal plate, about as long as the last three normal joints of the abdomen. *Color:* Variable; frequently both sexes of a dull pea-green color, with a broad, distinct, white, satin-like band from behind the eye to the base of hind thigh, and sometimes continued along thigh to distal end; tarsi glaucous, reddish at base, with the spines black; antennæ testaceous. Other specimens are entirely testaceous reddish, and others greyish-brown, with the white band as before; but the inside of the base of the thigh usually brighter or redder testaceous than any other part. Some specimens have irregularly scattered black dots. *Measurements—Female:* Total length from front end of head to tip of sub-anal plate, 2 ins. 3 lines. Proportional measurements to total length, $\frac{15}{100}$; head, $\frac{22}{100}$; prothorax, $\frac{9}{100}$; mesothorax, $\frac{3}{100}$; metathorax, $\frac{10}{100}$; (dorsal surface of whole thorax, $\frac{22}{100}$); abdomen, $\frac{56}{100}$; hind femur, $\frac{27}{100}$; hind tibia, $\frac{25}{100}$; hind tarsus, $\frac{5}{100}$; middle femur, $\frac{5}{100}$; middle tibia, $\frac{4}{100}$; middle tarsus, $\frac{3}{100}$; anterior femur, $\frac{5}{100}$; anterior tibia, $\frac{4}{100}$; anterior tarsus, $\frac{4}{100}$; sub-anal plate, $\frac{3}{100}$. *Male:* Total length from front end of head to tip of sub-anal plate, 1 in. 5 lines. Proportional measurements to total length: Antennæ, $\frac{15}{100}$; head, $\frac{22}{100}$; prothorax, $\frac{10}{100}$; mesothorax, $\frac{2}{100}$; metathorax, $\frac{10}{100}$; (dorsal surface of whole thorax, $\frac{22}{100}$); abdomen, $\frac{57}{100}$; hind femur, $\frac{30}{100}$; hind tibia, $\frac{28}{100}$; hind tarsus, $\frac{6}{100}$; middle femur, $\frac{6}{100}$; middle tibia, $\frac{4}{100}$; middle tarsus, $\frac{3}{100}$; anterior femur, $\frac{5}{100}$; anterior tibia, $\frac{4}{100}$; anterior tarsus, $\frac{4}{100}$; sub-anal plate, $\frac{15}{100}$.

The most striking characteristic of the Locusts of this genus is the position of the eyes in the middle of the sides of the very long, slender, conical head, far removed from both the antennæ and the prothorax.

M. M. Charpentier and Audinet Serville long ago observed that the larvæ and pupæ of some species of *Truxalis* had a very long, compressed, pointed sur-anal plate over the other abdominal appendages, not present, or only of very reduced dimensions, in the adult; the latter writer believing that this curious structural peculiarity belonged only to the females, as it was wanting completely in a male pupa in his possession. The same fact may be observed in the present insect, in which the upper abdominal plate in the adult female, as figured in our plate, scarcely exceeds the lateral plates in length; but in the smaller individuals in the pupa state, the same plate is as long and sharp-pointed as the sub-anal plate of the males, equalling in length the $2\frac{1}{2}$ last joints of the abdomen (the 7th, 6th, and half of the 5th), as represented in the above woodcut. What can be the significance of this unusual change in relative size of this plate at different stages of development, it is impossible at present to suggest.



Pupa of female, twice the natural size, to show the temporarily long sur-anal plate. The line below shows the natural size.

The terminal portion of the antennæ, equalling about 4 of the preceding joints in length, has such obscure indications of joints that the number is somewhat doubtful.

EXPLANATION OF FIGURES.

PLATE 139.—Fig. 5, female, natural size. Fig 5*a*, side view of head and thorax, magnified three diameters, showing structure of small mesothorax and large divided prothorax and metathorax, with oblique sulci indicative of traces of undeveloped wings and elytra. Fig. 5*b*, under view of same, showing small spine on presternum and wide channelled sternum behind. Fig. 5*c*, abdominal plates and appendages of same, magnified. Fig. 5*d*, hind leg, magnified, showing ridges, granules, and swollen tympanum near distal end. Figs. 5*e* and 5*f*, side and inner views of middle tarsi of same, more highly magnified. Fig. 5*g*, side view of anterior leg, similarly magnified. Fig. 6, male, natural size. Fig. 6*a*, sub-anal plate and abdominal appendages, magnified.

FREDERICK McCOY.

PLATE 140.

TROPINOTUS AUSTRALIS (LEACH).

THE CINNAMON KEEL-BACKED LOCUST.

[Genus TROPINOTUS (AUD. SERV.). (Sub-kingdom Articulata. Class Insecta. Order Orthoptera. Section Saltatoria. Family Acrididæ.)

Gen. Char. — Head large, elongate; anterior face narrow in front, with flat converging sides, vertical, with two longitudinal approximate keels in the middle and one other on each side; front projecting forward between the antennæ in a slightly acute thick cone. Eyes oval, not very prominent; antennæ shorter than thorax, thick, of about 20 slightly flattened joints, arising very close together, filiform; palpi of slender joints. Thorax strongly compressed above, inversely boat-shaped, with a very large, median, dorsal, compressed, arched keel, extending in front over the head in a point, and from the metathorax in a point behind over the elytra beyond the base of the wings, the anterior and posterior lateral margins converging obliquely to those points, the posterior very acutely; presternum small, with one central, long, acutely-conical spine in middle, sometimes bifid at tip; meso- and meta-sternum very broad, flat, smooth. Elytra a little longer than the abdomen, with fine neuration; wings ample, a little shorter than the elytra. Abdomen large, with a strong, dorsal, median keel; appendages short, setaceous; sub-anal plate of male large, curved upwards, convex, triangular tip extending beyond the abdomen. Posterior legs large, thighs moderately thickened, with chevron marks on side; tibiæ, except at base, with two equal rows of tooth-like spines; tarsi 3-jointed; pads between claws small; maxillary palpi of 5 joints; labial palpi of 3 joints; maxillæ tridentate. South America, South Africa, and Australia.]

DESCRIPTION.—*Female:* Length from front of head to end of abdomen, 1 in. 9 lines. Proportional measurements to length (taken as 100): Length of head, $\frac{6}{100}$; prothorax, $\frac{38}{100}$; tegmina, $\frac{83}{100}$; wings, $\frac{78}{100}$; antennæ, $\frac{20}{100}$; hind thigh, $\frac{47}{100}$; hind tibiæ, $\frac{40}{100}$; width of tegmina, $\frac{20}{100}$. Head and thorax minutely and irregularly granulated. Antennæ of 23 joints, less than half the length of head and thorax. Elytra considerably longer than abdomen, narrow, oblong, obliquely truncated at distal end, translucent, but not so transparent as the wings, minutely netted. *Color:* Whole body, head, thorax, abdomen, legs, and elytra, light, dull cinnamon-brown, with minute, scattered, blackish speckles; wings with veins of the same color, and the membrane a little lighter and more pale yellowish-tawny at base, the anterior costal portion nearly like the tegmina. Legs and tarsi paler. *Male:* Like female in size, shape, and color, except the large sub-anal plate and longer lateral appendages.

REFERENCE.—*Gryllus Australis*, Leach, Zool. Misc., v. i., p. 56, t. 24 = *Tropinotus cinnamonicus*, Serv., Hist. Nat. des Insect. Orthop., p. 620.

The *Tropidonoti*, or keel-backed Locusts, differ from ordinary Locusts in the great compression of the midline of the thorax into a high-arched prominent keel, extending over the head in front and over the base of the abdomen behind, from which the genus derives its name. The single median spine of the presternum, and the great compression of the narrow-keeled face in front, and the angular frontal projection of the head, are also peculiar characteristics of these insects, in which they approach the *Truxali*, or

Cone-headed Locusts. In habits they are like many other Locusts, chiefly found on the ground or low bushes, and laying their eggs in the earth. They are not, however, gregarious, nor migratory, being only found one here and there. The drum in first abdominal segment is large, and, as usual in the family, the two hinder segments of the sternum are very wide, flat, and smooth. The labrum, mandibles, maxillæ with their palpi, and the bilobed labium, agree with the character of those parts in the family generally.

The size of individuals of this species varies considerably, but the males are little less than the females, contrary to Audinet Serville's impression. Some specimens are lighter than others in color. The ocelli are very minute. The presternal spine is bifid at the tip.

Although not uncommon, it does not occur in the proportion of one to a hundred of the yellow-winged Locust, *Œdipoda musica*, and, like the *Opsomala*, has no gregarious habits, one or two individuals being found in one spot on the ground amongst the scrub or dwarf bushes around Melbourne. The female, when depositing her eggs, forces the abdomen an inch into the ground, making up for want of long ovipositor of the Grasshoppers.

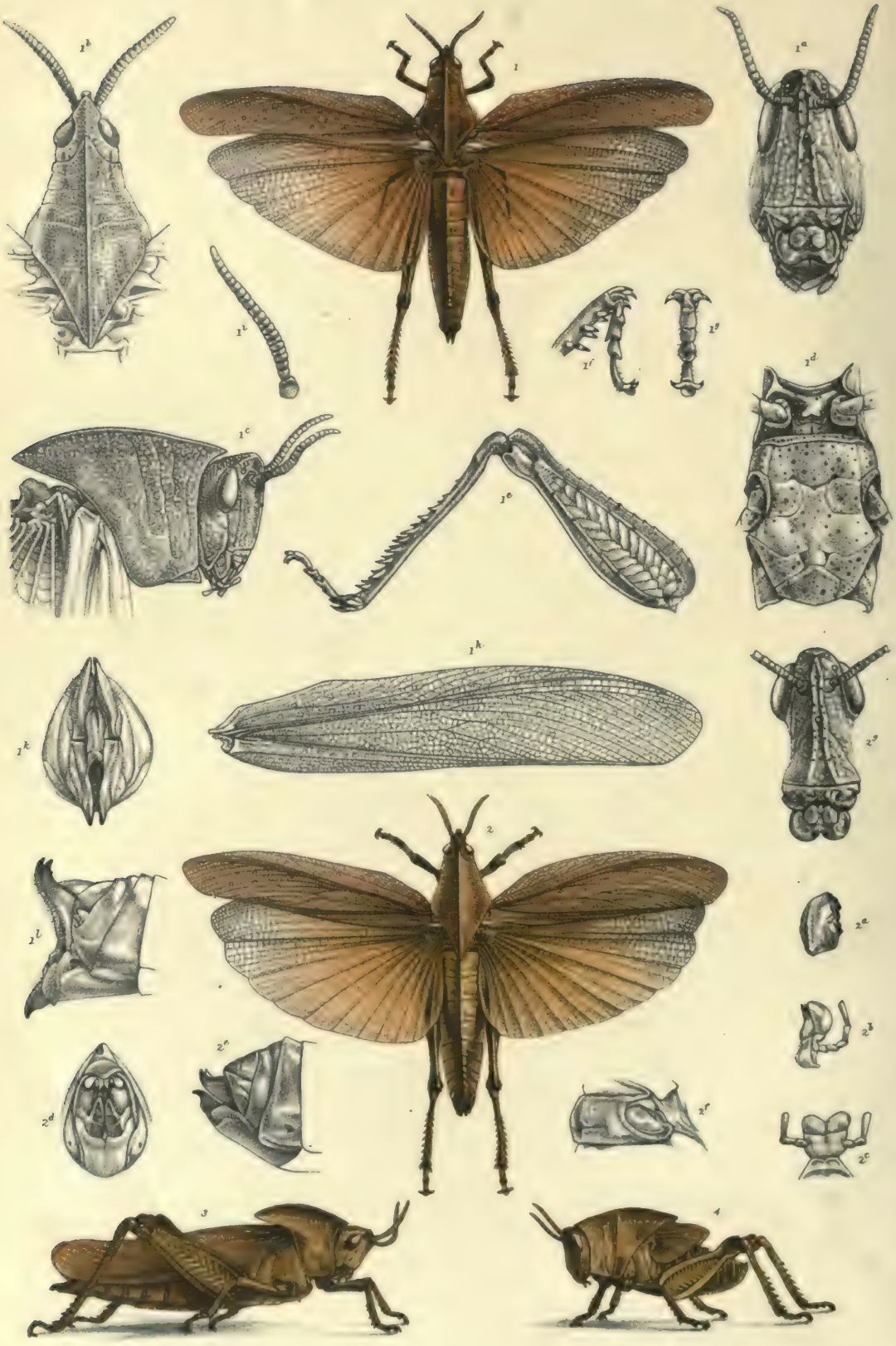
EXPLANATION OF FIGURES.

PLATE 140.—Fig. 1, female, natural size, flying. Fig. 1*a*, front view of head, magnified three diameters, to show the compressed face, four longitudinal keels, two eyes, three ocelli, and antennæ. Fig. 1*b*, head and thorax, viewed from above, magnified two diameters, to show granulation and transverse sulci. Fig. 1*c*, side view of head and thorax, to show nearly vertical line of face and keel-like extension of the metathorax over the bases of the elytra and wings, magnified two diameters. Fig. 1*d*, under-side of sternum, magnified two diameters, showing the narrow presternum, with the large bifid spine between the base of the anterior pair of legs, and the wide, smooth, meso- and meta-sternal parts, between the bases of the second and third pairs of legs. Fig. 1*e*, hind leg, magnified two diameters, showing the chevron marks on the thigh, and the two rows of coarse spines on the tibia, obsolete at base. Fig. 1*f*, side view of three-jointed tarsi, magnified three diameters. Fig. 1*g*, same, viewed from below, showing the apparent division of the basal joint and large pad between the claws. Fig. 1*h*, one of the elytra, magnified two diameters, to show the reticulation. Fig. 1*i*, one of the antennæ, magnified three diameters. Fig. 1*k*, terminal abdominal plates, viewed from behind, magnified three diameters. Fig. 1*l*, the same, viewed from the side. Fig. 2, male, natural size, in flying position. Fig. 2*a*, mandible, magnified three diameters. Fig. 2*b*, maxillæ, showing bifid tip, large hood, and slender palpi, magnified three diameters. Fig. 2*c*, bilobed labium, with three-jointed palpi, magnified three diameters. Fig. 2*d*, sub-anal plate and appendages at end of abdomen, viewed from behind, magnified three diameters. Fig. 2*e*, same, viewed from the side. Fig. 2*f*, drum in first abdominal segment, magnified two diameters. Fig. 2*g*, front view of compressed head, magnified three diameters. Fig. 3, specimen in walking position, with the wings closed, viewed sideways, natural size. Fig. 4, immature pupa, in the walking position, viewed from the side, to show the very short elytra and undeveloped wings, natural size.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Insects)



J. Wild. del. et. lith.

Prof. McCoy direct.

Steam lithic Govt. Printing Office.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XV.

BY

FREDERICK McCOY, C.M.G., M.A., Sc.D. Cantab., F.R.S.,

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PREFACE.

This fifteenth Decade continues the illustrations of Victorian Reptiles by figures, for the first time of the colours of life, on Plate 141, of the *Egernia*, or Spiny-ridged Lizard; and, on Plate 142, of the *Pseudechys Australis*, a very deadly snake confined in Victoria to the hot northern boundary, where it is usually confounded with the Brown Snake (*Diemenia*), figured on Plate 23 of our third Decade, although really most allied to the equally fatal Black Snake (*Pseudechys porphyriacus*), figured on Plate 1 of the first Decade.

The illustrations of the Victorian Fishes are continued with, on Plate 143, one of the numerous "Leather Jackets" (*Monacanthus Peronii*) of our coasts, not recognisably figured before; and, on Plate 144, of the first occurrence in Australia of the curious "Spinose Shark," *Echinorhinus spinosus*, of which the previously published figures are very erroneous.

Plate 145 gives the most nearly complete figure yet published of Banks' Oar-Fish (*Regalecus Banksi*), a creature of extremely rare occurrence, and most probably the "Sea Serpent" of mariners.

The next three plates continue the illustrations of the Polyzoa so abundant on our coasts, the descriptions and specimens of which Mr. MacGillivray gives for this work and the National Museum.

Plates 149 and 150 give full structural details of the Common Melbourne Crawfish, or Spiny Rock Lobster, which has not been figured before, and which I have been at great trouble to prove identical with that common at the Cape of Good Hope, although quite different from that of Sydney and other more northern localities. This "Southern" species abounds in Tasmania, New Zealand and the Island of St. Paul, as well as at the Cape of Good Hope.

The succeeding decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest and of which good figures do not exist or are not easily accessible.

FREDERICK McCOY.

October, 1887.

ZOOLOGY OF VICTORIA

(Reptiles)

W. J. J. Wild del. et lith.

Prof. McCoy direct.

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PLATE 141.

EGERNIA CUNNINGHAMI (GRAY).

THE SPINY-RIDGED LIZARD.

[Genus EGERNIA (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Scincidæ.)

Gen. Char.—Head semi-rhomboidal, thick, flattened above, narrowed and rounded in front; shields convex, rugged; nasals ovato-triangular, nearly touching above; nostrils large, round, with prominent edges, with curved groove behind; supranasal none; rostral triangular; internasal large, rhomboidal, as long as broad; fronto-nasals rhombic, separate, lateral; frontal moderate, elongate, narrow behind, hexagonal; fronto-parietals two, contiguous in front, diverging behind to receive the anterior part of the interparietal, which is like the frontal but smaller; parietals moderate, semi-ovate; a row of 6 or 7 large temporal shields between the fronto-nasals and parietals over the eye; orbit without any scales between it and the hinder labial plates; eyelids distinct, lower eyelid scaly; ear-opening large, oval, with four large, pointed, lobe-like scales on anterior edge; tongue thin, flat, wide, notched at tip. Body fusiform, sides rounded; tail cylindrical, gradually tapering, conical, as long as the body. Legs four, strong; toes long, slender, compressed, unequal, clawed. Scales thick, bony: of back, sides, and upper part of limbs broad, hexagonal, each with a strong, central keel ending posteriorly in a strong spine directed backwards and upwards; those of the six rows on tail much the largest; those of nape with 3 or 5 longitudinal grooves; those of throat and belly broad, thin, smooth, hexagonal or ovate. Teeth large. Australia.]

DESCRIPTION.—*Colour:* Above, brownish-olive, irregularly mottled with blackish-brown and whitish on the sides; head brown; chin and throat yellowish-white or grey; under surface of chest, belly, and tail yellowish and greyish-white, with an olive tint on the sides and strongly mottled with blackish-brown. A variable number of small angular white spots in some specimens on flanks, tail, and upper side of legs. Tongue greyish-blue. Iris dark-brown. About 20 rows of spines directed backwards, forming as many narrow, prominent ridges on upper surface of body; about 7, stronger, with much larger and more elevated spines on tail, and 5 or 6 smaller, spinose ridges on upper aspect of each leg; scales on back of neck not ridged, nor spinose, but with 3 or 5 longitudinal grooves; scales of under side of throat, breast, belly, and tail smooth, with thin, rounded, imbricating edges, and a few faint, longitudinal ridges. *Measurements:* Length, 1 ft. 2 ins. 6 lines. Proportional measurements to total length (taken as 100):—Length of head, $\frac{11}{100}$; width at base of ear, $\frac{9}{100}$; from tip of snout to front of orbit, $\frac{5}{100}$; height of rostral, $\frac{1\frac{1}{2}}{100}$; length of internasal, $\frac{2\frac{1}{2}}{100}$; width, $\frac{2\frac{1}{2}}{100}$; length of frontal plate, $\frac{3}{100}$; width, $\frac{2}{100}$; length of interparietal, $\frac{2}{100}$; from tip of snout to anterior leg, $\frac{22}{100}$; to front of posterior leg, $\frac{54}{100}$; length of tail, $\frac{42}{100}$; width of tail at base, $\frac{9}{100}$; at middle, $\frac{3\frac{1}{2}}{100}$; longest hind toe, $\frac{6}{100}$; longest toe on anterior foot, $\frac{4}{100}$; length of anterior leg to origin of toes, $\frac{12}{100}$; length of hind leg to origin of toes, $\frac{12}{100}$; width of middle of body, $\frac{14}{100}$; depth of ditto, $\frac{10}{100}$. Four scales in length of 6 lines in middle of belly; 4 spinose ridges in same space on back, with 4 scales in same space lengthwise; 3 ridges in same space on tail, and little over 2 spines lengthwise.

REFERENCE.—Stokes' Discoveries in Australia v. 1, p. 499, t. 2.

The Lizards of the genus *Egernia* resemble *Cyclodus* and *Trachydosaurus* (illustrated in former plates) in many respects, but differ in the comparatively long slender toes, the orbit not separated by a row of plates from the labial plates, and in the strongly keeled and spined scales. The tail being conical with a circular section throughout, separates *Egernia* from *Silubosaurus*, which, except for the depressed tail of the latter, it otherwise much resembles.

This rare Lizard was formerly not uncommon at Merri Creek and similar rocky places near Melbourne, and at Sunbury.

The indigo-blue colour of the tongue is so striking as to suggest the popular name of Blue-Tongue for both the banded and the blotched species of *Cyclodus* (*C. gigas* and *C. nigroluteus*), and this *Egernia;* but the latter, which has the tongue of the same colour, but paler, is easily distinguished by its long slender toes and ridged and strongly spined scales.

The specimen figured is from Brighton.

Not figured of the colours of life before.

EXPLANATION OF FIGURES.

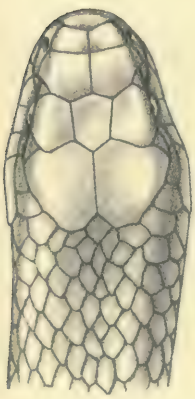
PLATE 141.—Fig. 1, side view of average specimen, two-thirds the natural size. Fig. 1*a*, top of head, natural size, to show form and ridging of plates and scales. Fig. 1*b*, side view of head, natural size. Fig. 1*c*, front view of snout, magnified two diameters, to show rostral plate, nasal plates and nostrils. Fig. 1*d*, underside of head and throat, two-thirds the natural size. Fig. 1*e*, eye, with surrounding scales, magnified two diameters. Fig. 1*f*, nasal plate and nostril, magnified two diameters. Fig. 1*g*, teeth of lower jaw, magnified three diameters. Fig. 1*h*, scales of tail, magnified two diameters. Fig. 1*i*, scales of back, magnified two diameters, Fig. 1*k*, scales of belly, magnified two diameters. Fig. 1*l*, anterior foot, viewed from below, natural size. Fig. 1*m*, hind foot, viewed from below, natural size.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Reptiles)

1b



2

1c

1a

1

L.^t Wild del. et lith.

Prof.^r M.^c Coy direx.^t

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PLATE 142.

PSEUDECHYS AUSTRALIS (GRAY).

THE BROWN PSEUDECHYS.

[Genus PSEUDECHYS (WAGLER). (Sub-kingdom Vertebrata. Class Reptilia. Order Ophidia. Family Elapsidæ.)

Gen. Char.—Body and tail moderately elongate, gradually tapering. Head sub-quadrate, flattened above and at the sides, obtusely rounded in front, little wider than the neck behind; no loreal plate; one anterior ocular plate forms the front margin of the orbit, and two posterior oculars its hind edge; two nasal plates, with the nostril between them. Scales of the back flat, smooth, in about 17 rows; anal plate double, a variable number of the anterior sub-caudal plates in one row, behind which they form two rows. Confined to Australia.]

DESCRIPTION.—Scales of back in 25 rows across neck, close behind occipital plates, 17 rows across middle of back, and 13 rows across base of tail; vertex plate elongate, hexagonal, nearly twice as long as wide, wider in front than behind, length more than one-third greater than the space from its anterior angle to posterior edge of rostral plate. Abdominal scales, 210; anal (and preceding) plate double; sub-caudal plates 11 single (1st, 2nd, and 10th double in specimen described), 61 double. *Colour:* Above uniform brown, under side paler, with the edges slightly darker. Total length of body and tail, 6 ft.; length of tail, 1 ft.; length of head from snout to end of occipital plates, 1 in. 2 lines; from tip of snout to end of gape, 1 in. 2 lines; vertex plate, $4\frac{1}{2}$ lines long, hexagonal, $2\frac{2}{3}$ lines wide in front, long sides 3 lines, across posterior lateral angles 2 lines; width of two occipital plates together, 9 lines; length of occipital plate, 6 lines; posterior frontal, $3\frac{1}{2}$ lines; anterior frontal, $2\frac{1}{3}$ lines; fronto-nasal, $1\frac{1}{2}$ lines; width of rostral, 4 lines; height of rostral, $3\frac{1}{2}$ lines.

REFERENCE.—*Naja Australis,* Gray, Zool. Misc., p. 55.

The head seems broader than in the Black Snake (*P. porphyriacus*) figured on our first plate, and more rounded at the sides towards the front, the anterior and posterior frontals being shorter; the vertex plate is longer in proportion to the length of the suture from its anterior angle to the posterior angle of the rostral plate, but I observe that undoubted specimens of the Black Snake vary considerably in the shape and proportion of the vertex plate, some being slightly shorter in proportion to the width, but they all seem to have, as in our figure, Plate 1, fig. 2*c*, the lateral sides nearly parallel, while in *P. Australis* the vertex plate narrows perceptibly posteriorly, and is always greatly longer in proportion to the width. As in the Black Snake (*P. porphyriacus*) my figure

of the top of the head in Plate 1, fig. 2*c*, shows the form of the plates in the young (one-third larger than nature), and as the adult of the same size as our present figured *P. Australis* always has the vertex plate proportionally broader and shorter than in the young, I give in the present Plate 142, fig. 2, a representation of the top of the head, natural size, of a Black Snake of the same size as fig. 1*b* of the present species, so that the relative differences of the shape, length, and width of the vertex plate, and the proportionate distance from it to the rostral plate may be seen in each. The vertex plate is scarcely one-fifth longer than wide, or nearly as broad as long in the adult *P. porphyriacus*, the length being slightly less than from its anterior angle to posterior angle of rostral plate, and nearly twice as long as wide in *P. Australis*, in which the plates in front are shortened, giving the blunter or wider outline to the anterior part of the head in it.

The belly has the colour and lustre of polished copper in some specimens.

This species is only found in the warm northern parts of the colony near the Murray, being very abundant on the scorching plains, and very virulent and deadly in the bite, both for man and beast. The figured specimen is from Kewell.

Not figured of colours of life before.

EXPLANATION OF FIGURES.

PLATE 142.—Fig. 1, ordinary specimen, one-half natural size, showing the single row of anterior subcaudal plates (with an abnormal doubling of the two anterior ones) and the two rows of posterior subcaudals (with an abnormal single one following the first pair). Fig. 1*a*, side view of head, natural size. Fig. 1*b*, top view of head, natural size, showing the elongate form of the vertex plate. Fig. 1*c*, front view of same, to show rostral plate, natural size. Fig. 2, top view of head of Black Snake (*P. porphyriacus*) natural size, to show the broader and shorter vertex plate, and the greater proportional distance from its anterior angle to posterior angle of rostral plate.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Fishes)

A. Bartholomew del. et lith.

Prof. Mc Coy direxit.

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PLATE 143.

MONACANTHUS PERONII (HOLLARD).

PERON'S LEATHERJACKET.

[Genus MONACANTHUS (CUV.) + ALUTERIUS (CUV.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Telostei. Order Plectognathi. Family Sclerodermi.)

Gen. Char.—Body compressed, elevated in the middle; scales small, rhombic, distinct on inner surface of skin, obscured by minute spines roughening the outer surface; sides of tail with 4 or 6 hooked spines in 2 or 3 rows, smaller or absent in females. Lateral line absent or indistinct. Teeth, six broad, flat, sharp-edged incisors in outer row of each jaw, and four, forming an inner row, in upper jaw, alternating, one between the 1st and 2nd, and the other between the 2nd and 3rd on each side of the outer row. Fins: 1st dorsal composed of one large, thick, rough, bony spine, which may be fixed in erect position or lowered into a pit on back, over the eye; membrane very small, triangular at base, with or without a second, small, rudimentary spine: soft dorsal and anal long and low, with simple unbranched rays; pectoral small, rounded; caudal rounded; ventrals replaced by a small spine, sometimes rudimentary or absent. Branchial slit in front of base of pectoral. No barbel to chin. Tropical and sub-tropical seas.]

D. 33 to 34; A. 33; P. 12; C. 12.

DESCRIPTION.—Body sub-ovate, compressed; profile of forehead slightly concave between eye and snout, rising with gentle convexity to origin of second dorsal at an angle of about 30°. Lower lip slightly protruding beyond the upper. Greatest depth of body about twice and a half in total length, including caudal fin. Eye large, a little below frontal edge; branchial slit oblique, slightly longer than diameter of eye, lower end in front of upper base of pectoral. First dorsal spine with its anterior base over middle of eye, thick, strong, quadrate in section, slightly arched forwards, about half the length of from anterior edge of orbit to mouth; the four edges set with about 15 conical spines arched downwards and outwards, those on two anterior ridges nearly three times as large as those on posterior ridges, which are more equal, numerous, and closer; a row of smaller spines on base of front and lateral faces. One very small ray in membrane behind the great spine; pelvic spine at end of long bony ridge of ventral edge very small, with a few rounded granules on middle, and 4 or 6 triangular spines on posterior end directed backwards; abdominal edge from pelvic spine to anus convex or concave according to temporary causes, ventral edge rising abruptly from end of spine to front of anal fin. *Fins:* Pectoral semi-oval, of 12 rays; dorsal high, moderately convex, of 34 rays, increasing in height to ninth ray, gradually decreasing thence to posterior end; anal of 33 rays, moderately deep, rounded, rays lengthening gradually to sixth or seventh, gradually diminishing to posterior end; caudal fin narrow, rounded, of 12 thick, branched, spinulose rays. *Skin:* With oval scales, marked with radiating, close, branched ridges, each scale having from its centre a long, thick, cylindrical spine obliquely dilated and subtruncated at an obtuse angle in front, leaving an acute point directed backwards at the tip, in most portions of the body; but, in a few places, terminating in an arched, acute, spinous tip with the dilatation lower down on the stem. In specimen described no "tooth-brush" group of bristle-like spines on sides

of tail, nor conical thorns; in other specimens, probably males, the "tooth-brush" spines, $6\frac{1}{2}$ lines long, are developed on each side of tail, without thorns. *Colour:* Whole body yellowish-brown, fading irregularly into paler on throat, tail, and middle of body; irregularly spotted with darker brown in most specimens; dorsal and anal fins with nearly colourless membranes, and yellowish-brown rays; caudal with pale dusky membrane and yellowish-brown rays, darker than those of the dorsal or anal fins, crossed by two narrow brown bands, one near the middle and one near the posterior edge; under a lens the scales are minutely dotted with black. *Measurements:* Total length from snout to end of caudal fin, 10 inches. Proportional measurements to total length, as 100:—Snout to anterior end of orbit, $\frac{24}{100}$; greatest depth of body, $\frac{42}{100}$; greatest thickness behind head, $\frac{13}{100}$; diameter of eye, $\frac{5}{100}$; height of 1st dorsal spine, $\frac{10}{100}$; distance of base from edge of upper teeth, $\frac{27}{100}$; length of branchial slit, $\frac{5\frac{1}{2}}{100}$; length of pectoral, $\frac{12}{100}$; length of 2nd dorsal, $\frac{31}{100}$; greatest height of ditto, $\frac{12}{100}$; from snout to anterior ray of ditto, $\frac{48}{100}$; from snout to anterior ray of anal, $\frac{53}{100}$; length of anal, $\frac{28}{100}$; greatest height of ditto, $\frac{9}{100}$; length of caudal, $\frac{15}{100}$. Number of spines in space of 3 lines, about middle of body, 6.

REFERENCE.—Ann. des Sciences Nat., 4th série., v. 2, p. 356, t. 13, f. 8.

The small skin-spines of this species only present the appearance figured by M. Hollard, when looked down upon with a magnifier from above, but when a bit of skin is cut off and properly mounted to allow of a side view, the spines are all as in our plate, widening near the point, which is obliquely truncated at an obtuse angle, which angle, in some points of view, looks exactly like a swelling below the apex, as in M. Hollard's figures and descriptions. When fresh the spines are covered with a thick, finely black-dotted skin, which soon shrinks from the apex, leaving the sharp point exposed; and very often it also shrinks from the stem, leaving a portion at the angle where the oblique truncation of the apex occurs, thus increasing the appearance of a bulb below the point. In the male, with the "tooth-brush" group of setaceous spines on the sides of the tail, the form is rather more slender, the depth being less than one-third of the total length, including caudal fin ($\frac{33}{100}$); and the head in front of eye is perceptibly longer and forming a smaller angle with the midline.

In our male specimen the dorsal fin has 32 rays, and the anal 31; another female has 34 dorsal and 32 anal rays; the figured specimen has 34 dorsal and 33 anal. In our specimens the end of the pelvic spine may be drawn out so that the depth of body is one-half the total length, excluding caudal fin; and it may

be pressed in so as to give the most slender proportion indicated above. There are two specimens in the Museum collection in which the great dorsal spine is doubled, one on each side of the midline.

Our male specimen is from Warrnambool, presented by C. H. Lay, Esq., (12½ ins. long), with distinct round brown spotting on back and under dorsal fin, spots becoming larger and less distinct on rest of body. Another in the collection is from over the Lightning Rock, at Port Phillip Heads.

EXPLANATION OF FIGURE.

PLATE 143.—Fig. 1, average female specimen, ⅝ natural size. Fig. 1*a*, side view of teeth, twice the natural size. Fig. 1*b*, first dorsal spine, magnified twice the natural size (tip imperfect), showing the anterior and posterior thorns and second ray in membrane at base. Fig. 1*c*, section of first dorsal spine, three times the natural size. Fig. 1*d*, skin-spines from near middle of side, showing radiated base, slender stem and dilated, obliquely truncated upper end, magnified about twenty times natural size. Fig. 1*e*, shorter and thicker spine, magnified about twenty times natural size. Fig. 1*f*, ventral spine, three times the natural size. Fig. 1*g*, skin-spines from under pectoral, covered with soft skin, magnified twenty diameters. Fig. 1*h*, very slender spines, with diminished dilatation from near tail, magnified twenty diameters. Fig. 1*i*, some of the skin-spines with the external soft skin shrunk from all but a small space near dilated tip, magnified twenty diameters. Fig. 2, spine from another specimen, with the apex perfect, showing the forward arch and second ray and membrane at base, natural size. Fig. 2*a*, section of ditto, three times natural size. Fig. 2*b*, section of tail of same specimen to show the "tooth-brush" lengthened spines on sides.

FREDERICK McCOY.

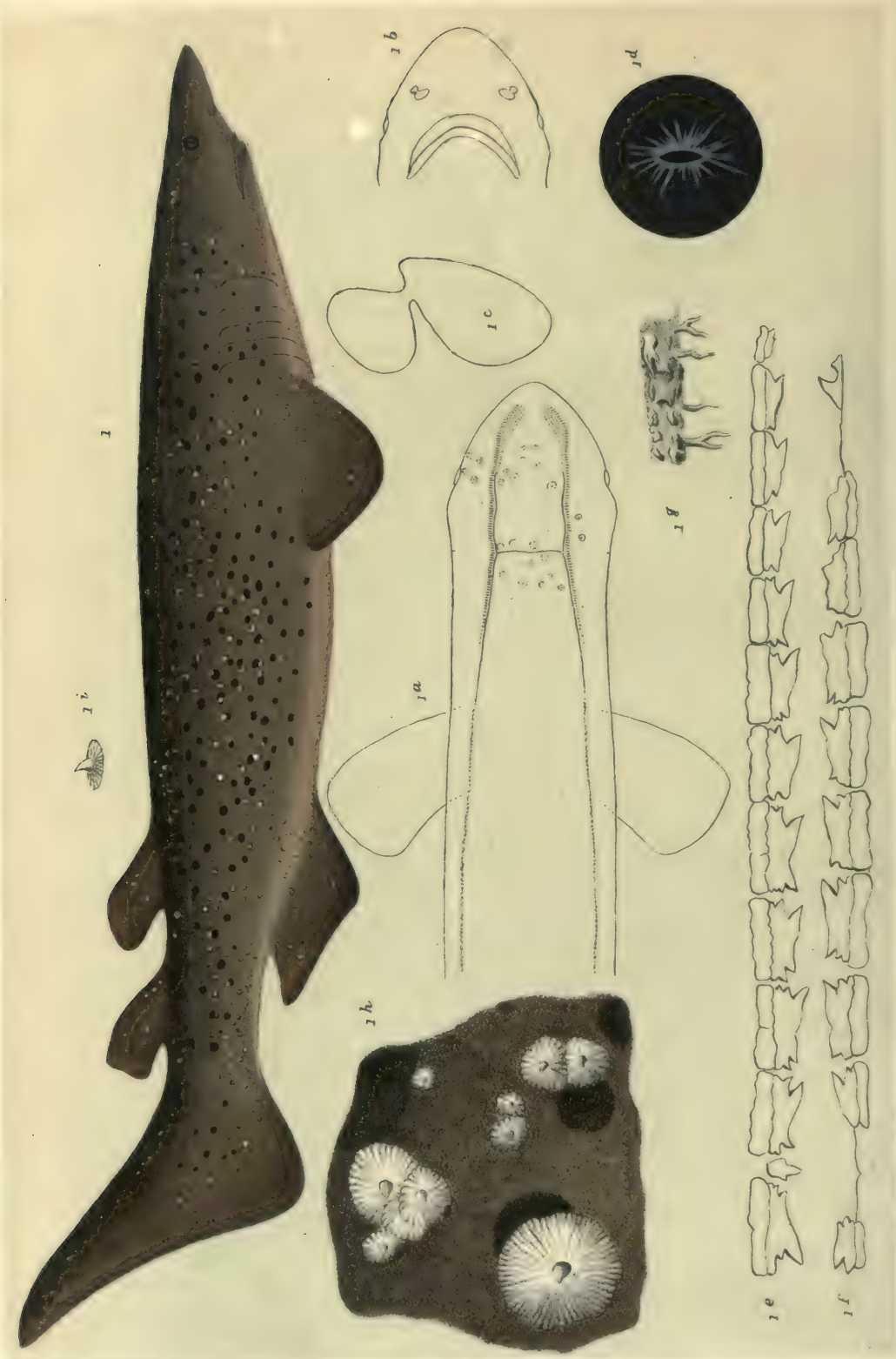

1
1b
1a
1h
1b
1d
1c
1g
1e
1f

PLATE 144.

ECHINORHINUS SPINOSUS (LIN. SP.).

THE SPINOUS SHARK.

[Genus ECHINORHINUS (BLAINVILLE). (Sub-kingdom Vertebrata. Class Pisces. Order Plagiostomata. Section Selachoidei. Family Spinacidæ.)

Gen. Char.—Dorsal fins two, small, nearly equal, without anterior spine, the anterior edge of anterior dorsal slightly behind the anterior margin of ventrals. No anal fin. Skin with radiated, bony tubercles with conical spine in the middle, very irregular in size and disposition. Mouth crescentic, with a strong fold of skin round the angle. Teeth approximately equal in both jaws, having nearly horizontal cutting edges, from the principal cusp being directed backwards and very little upwards, with large denticles on the anterior and posterior bases of all except the one or two posterior teeth. Nostrils reniform, nearly half-way between eye and tip of snout. Spiracles very small, behind the eye and behind the vertical of the corner of the mouth. No nictitating membrane. Gill openings of moderate size.]

DESCRIPTION.—Body thick, fusiform. Head flattened above, semi-elliptically rounded in front, the width at posterior edge of orbits about one-fourth greater than the length of the snout to the line connecting them. Nostrils reniform, with long, slender median lobe extending backwards from anterior margin; the anterior edge a little nearer to tip of snout than to posterior edge of orbit. Dorsal fins higher than long, oblong, rounded, subtruncate at upper posterior edge; first dorsal commencing a little behind vertical of anterior edge of ventrals; second dorsal rather less than the length of the base of the first dorsal behind it. Tail strong, short, raised; caudal fin broad, with a slightly concave posterior edge, and a nearly rectangular, posterior, lower, rounded angle. Ventrals rhombic. Pectorals oblong. Gill openings moderately large, about half of the posterior one above and half below the anterior edge of pectoral; the anterior one with three-fourths of its length above same level. Lateral line at end of tail running into the caudal fin to the edge, coinciding with junction of upper lobe and fin for a short distance, and thence extending forwards in a nearly straight line a little above one-fourth of the depth from mid-line of back as far as the vertical of the anterior edge of the third gill opening. In all this length it is roughened with rows of minute, slender, hooked spines; beyond this the line extends forward and a little upwards as two rows on each side of smooth mucous pores, having a transverse similar band connecting them a little behind the vertical of the hind angle of the mouth, the rows of pores extending thence with irregular flexures, widening and converging near tip of snout, but separated in front by a narrow space. *Teeth:* Ten above and ten below on each side; no tooth in the centre above; one small conical one with a small cusp on each side of base in centre below. *Skin:* Very thin, with minute, close granules and numerous, radiated bony spines, varying from 1 inch to $\frac{1}{12}$ inch in diameter of base, very irregular in size, shape and distribution, over the whole body and fins, except anterior portion of snout; radiating ridges of spines branching, and with shorter simple ones between as they diverge; central spine sharp, smooth, vertical, or with a slight downward or backward curve. *Colour:* Purplish-brown, paler below; back and sides with numerous, rounded, darker spots; whitish under chin and edge of lip; edges of pectoral, ventral and caudal fins darker brown; tubercles white. Iris greenish-black, with silvery and bronze-green and blue radiating lines from edge of pupil.

MEASUREMENTS.

	Ft.	ins.	lines.
Length from tip of snout to distal end of caudal fin	7	2	3
„ „ „ anterior edge of orbit	0	7	0
„ „ „ anterior edge of upper jaw ...	0	5	6
„ „ „ anterior edge of pectoral... ...	1	11	0
„ „ „ origin of 1st dorsal	4	3	0
„ „ „ origin of 2nd dorsal	4	11	6
„ „ „ origin of ventral	4	2	0
„ superior to inferior angles of caudal fin	1	8	0
„ anterior edge of lower lobe of caudal fin to tip of tail	1	11	0
„ „ to lower lobe of caudal	0	9	0
Height of 1st dorsal	0	7	0
Length of base of same	0	5	0
Height of 2nd dorsal	0	5	9
Length of base	0	4	0
„ „ of ventral	0	10	0
„ lower edge of same	0	7	0
„ posterior edge of same	0	8	6
„ upper edge of same	0	3	6
„ anterior edge of pectoral	0	9	6
Greatest width	0	7	0
Girth in front of pectorals	2	10	0
Diameter of orbit	0	2	0
Height of hind gill opening	0	5	6
„ anterior gill opening	0	2	6
Length from tip of snout to anterior edge of nostril	0	4	6
Width of head between upper edges of orbits	0	9	0
Length of base of anterior tooth of upper jaw	0	0	6
„ „ „ „ lower jaw	0	0	5½
Width of mouth	0	7	0

REFERENCES.— = *Squalus spinosus*, Gm. Lin., i., p. 1500; = *Echinorhinus spinosus*, Blain. F. F., p. 66; Yarrell Brit. F., 2nd ed., p. 532; = *Echinorhinus obesus*, Smith, Il. Zool., S. A. Pisc., t. 1; Couch F. Brit. I., v. 1, t. 12; Bonaparte, F. Ital. Pisci.

The careful figure here given is intermediate between Yarrell's first slender figure and Couch's short thick one, which latter more nearly agrees with Smith's South African drawing. Sharks, I know, vary considerably in this respect in different individuals of one species, and neither of the British authors seem to have seen the fish, and they have both published the drawings of amateurs sent to them—so that the present figure may very probably represent the average proportions. The short thick figure given by Couch from a drawing sent to him by Mr. Cocks, of Falmouth, is obviously not very accurate, as the five gill openings are made equal in length and entirely below the base of the pectoral; and the caudal fin being widest in the middle is improbable. The more slender figure above quoted as given by Yarrell, from a drawing sent to him by Mr. Hey, of the Filey Bay specimen, gives the relative sizes and positions of the gill openings more correctly. Several other figures are also about

as slender as ours, and the Prince C. Bonaparte's figure, in his *Fauna Italica*, is almost identical in shape and coloring with ours, but has the pectoral and ventral fins too large, and the gill openings too nearly equal. Dr. Smith's figure of the Cape of Good Hope specimen is much thicker, but does not seem very good, as the gill openings are entirely below the level of the base of the pectoral, although it shows the shape of the top of the head pretty well. A smaller specimen I have in the Museum from the Mediterranean is 5 ft. long, and 1 ft. 11 in. in girth in front of the pectorals, being, therefore, like ours in shape, and it agrees in all other particulars. The number of teeth above and below figured by the Prince of Canino is in accord with my counting of the Australian specimen rather than with Dr. Günther's, which latter is nearly double those in my European example also, and is probably a mistake of some sort.

All observers agree in this being a sluggish ground-shark, feeding on crabs and other creatures living on the bottom.

This is the first example recorded in Australian waters, and is one of the many rarities in the Museum I owe to the vigilance of Mr. M. Dusting, of Portland, where it was caught, on the 24th of November, 1886, on a shark line or rope, with baited hooks attached, let down to the rocky bottom by weights.

Explanation of Figures.

Plate 144.—Fig. 1, side view of specimen about one-tenth the natural size. Fig. 1*a*, top of head, to show shape of top of head and arrangement of mucous pores in front of the anterior terminations of the lateral line, one-tenth natural size. Fig. 1*b*, underside of head to show form and position of mouth and nostrils, one-tenth natural size. Fig. 1*c*, one of the nostrils, natural size, to show form of lobes. Fig. 1*d*, iris, natural size. Fig. 1*e*, central tooth and lateral series with one of opposite side, natural size. Fig. 1*f*, space without median tooth and lateral series, natural size (the penultimate one absent). Fig. 1*g*, portion of lateral line, to show spinulose appendages, natural size. Fig. 1*h*, portion of skin, natural size, to show the irregular superficial spines. Fig. 1*i*, small spine, viewed in profile, to show the relative shape of thorn and base, natural size.

Frederick McCoy.

A. Bartholomew del. & lith.

Prof. McCoy direx.

Steam Litho. Govt. Printing Office

PLATE 145.

REGALECUS BANKSI (CUV. SP.).

BANKS' OAR-FISH.

[Genus REGALECUS (BRÜNN.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygia. Family Trachypteridæ.)

Gen. Char.—Head small; mouth small, protractile, usually without teeth; body very long, gradually tapering to the tail, greatly compressed; gill openings wide, branchiostegal rays, 6; gills, 4; pseudobranchia. Fins: of simple rays, 1 dorsal, extending from nape to end of tail, the rays of anterior portion much higher and closer than the rest; no anal; no caudal; pectorals small, rounded; ventrals thoracic, each formed of one long, slender shaft, dilated at distal end. No air bladder.]

DESCRIPTION.—Length of head about 22 times in total length, or slightly less; greatest depth about 23 times in total length. Dorsal fin of 17 long, closely placed anterior rays, and 406 shorter ones, more widely separated, gradually diminishing to end of tail, extending slightly beyond the membrane, and each ray having a minute conical spine at its base. Pectoral rounded, of 12 rays. Ventrals each of 1 cylindrical shaft (imperfect, broken off in specimen 2 or 3 inches beyond base); 4 longitudinal, broad, flattened ridges, separated by narrow sulci, extend from head to tail over the lateral line, which cuts them off obliquely in front, by descending rapidly from nape to about one-fourth the depth of the body from ventral edge. Lateral line of narrow, elongate, oblong, tubular scales; it ends at about $\frac{1}{18}$ of the total length from the end of the tail (or 9 inches, at about $\frac{1}{3}$ of the depth, from the ventral edge). Preoperculum, operculum, interoperculum, suboperculum, and other bones of head irregularly pitted and radiatingly marked with short, irregular grooves. Eye large, flat, a little in front of and above middle of head. No teeth. Surface of skin studded with small, conical, slightly radiated, bony granules. *Colour:* Whole head and body brilliant metallic-silvery, slightly tinged with pale lavender-grey on back and anterior part of head; pectoral white; dorsal with bright red rays, the membrane rose-red, paler at base than at margin; about 19 vertical black streaks, half an inch wide, of variable length, cross the anterior half of the body, and 5 or 6 longitudinal rows of longitudinally oval, blackish spots on posterior three-fifths; no spots near tail. Iris white. Inside of mouth black. *Measurements:* Total length, 13 ft. 7 in.; length of head, 7 in. 6 lines; depth at vertical of eye, 5 in. 3 lines; greatest depth of body, 7 in. 3 lines; thickness of body, $2\frac{1}{2}$ in.; diameter of eye, 1 in. 6 lines; length of long anterior dorsal fin-rays (imperfect), 1 ft. 4 in. 6 lines; length of shorter ones on greater part of body, 2 in.; length of pectoral fin, 1 in. Six scales of lateral line in 1 in. Six granules of skin in space of $\frac{1}{2}$ in.

REFERENCES.— = (?) *Regalecus Glesne* (Ascanius) Icones Rer. Nat., t. 11; ? = *Gymnetrus Grilli* (Lindroth) Kongl. Vetensk. Acad. Nya Handl., t. 8; = *Gymnetrus Banksi*, Cuv. and Val., Hist. Nat. des Poiss., v. 10, p. 365; Hancock and Embleton, Annals of Nat. Hist., July, 1849, t. 1 and 2; = *Gymnetrus Hawkinsi*, Bloch, v. 12, t. 425.

So few examples of this fish have been observed, and those described were so imperfect, that I am very glad to be able to give a figure and description of an Australian one, caught in the waters

between the Tasmanian and Victorian coasts, in May, 1878. The tail is more nearly perfect than in any other described one, although, unfortunately, slightly mutilated now in stuffing, but to so small an extent that I give a figure of this part, natural size, to show the defect exactly. The extreme brittleness of the fin rays, as in all the family *Trachypteridæ*, has only left 2 or 3 inches of the basal portion of the shaft of each ventral fin, the dilated paddle-shaped distal end being absent, and leaving the length of the rays of the anterior dorsal crest uncertain. The great number of rays in the dorsal, which I give, is accounted for by the greater perfection of the tail end of the specimen in our Museum. Hancock's figured specimen is generally accepted as perfect, and he counts 268 rays in the dorsal behind the crest ; but as he states the fin rays to be 1 in. high at the end where, he says, thebody is 3 inches deep, I think this is an indication that the body had lost formerly about 2 ft. of the tail end, which had probably healed up in the very unnatural form he depicts, and as also represented in Mr. Couch's figure of the same specimen. Our specimen, a foot longer than his, tapers to a perfectly regular end, only half an inch in depth, and with the last rays of the fin only about $\frac{1}{13}$ of an inch high ; the 4 inches deep of fin and body he gives would be found at about 2 ft. from the end, and the missing portion would therefore have carried about 120 more rays than he gives, making a near approach to my number, which is clear. Lindroth counts 406 rays in the dorsal of his *Gymnetrus Grillii*. Although I think it quite likely that Dr. Gray is correct in considering *G. Glesne* and *G. Grilli* as different, imperfect, descriptions of imperfect specimens of the same species named *G. Banksi* by Cuvier and Valenciennes, and figured and described in detail by Hancock and Embleton, and that, therefore, the proper name to use would be *R. Glesne*, I prefer to use the name referring to Hancock's fish, concerning which there can be the least doubt of any of the figures and descriptions given before, particularly as Ascanius' figure of *R. Glesne* is proportionately shorter, and represents the fin as going round the caudal end of the body.

The silvering of the surface comes off at every touch, like the dust on a moth's wing.

The smaller proportional depth of the body compared to the total length in the fresh specimen I have examined, than in that caught in Filey Bay, and named the type of *G. Banksi*, may perhaps be a sexual peculiarity of the male. The depth published of the Filey Bay specimen, 13 ft. long, is 1 ft., and probably includes the fin ; in our specimen of the same length the fin is 2 in., and the body $7\frac{1}{4}$ in., or $2\frac{3}{4}$ in. less. The example caught in a shallow pool, in 1800, at the outer Fern Islands, was only 1 ft. deep, with a length of 18 ft. ; the one measured in 1845, at Alnmouth, was 16 ft. long, and 11 in. deep. The greatest length recorded is 24 ft., found on the Yorkshire coast, near Redcar, in 1850. The spines on the crest are cylindrical, hollow, and slightly rough. The granules on the body are like little seed pearls, largest on the ventral line.

I have little doubt that this fish is the "Sea Serpent" of the popular accounts in the newspapers of observations made far out at sea by captains of ships, perfectly trustworthy, but not sufficiently instructed in zoology to give good descriptions. The *Regalecus*, like the *Trachypterus*, is so excessively fragile that it is obvious it could only live in the depths of the ocean, far from land, where the water is still and free from the turbulence of the shallow soundings near the coasts, in which the majority of ordinary fishes flourish ; and the few specimens which have been caught were dead or dying, and much damaged in the shallow waters. As one recorded measured 24 ft. with a depth of about 1, we have here no inconsiderable approach to the dimensions reported of the "Sea Serpent." Making some reasonable allowance for the portion not exposed above the surface, and bearing in mind that many fishes continue to grow as long as they live, we may reasonably expect far longer specimens to exist in their proper habitats far from land, and occasionally showing on the surface there with just the appearance usually described, namely, a small head, with a "tall crest" and a fin along the back. Now there are Sea Snakes, well known, of small size, but no snakes or serpents have a crest and fin along the back ; while the description is fairly matched by our fish. I think captains of ships are too familiar with Seals, Conger Eels, or long stretches of ocean seaweeds to mistake any of them, as different

authors have suggested, for a "Sea Serpent," but the *Regalecus*, from its great rarity, would be quite unfamiliar, and its form would suggest a serpent to an untrained observer. The mode of progression described and roughly sketched by mariners, vertical undulations seen on the surface of the sea in the Sea Serpent, although so unusual in fishes, has actually been observed in this fish. The specimen caught by three Cullercoats fishermen, 6 miles from shore, in 20 to 30 fathoms water, was first seen lying on its side on the top of the water, obviously dying. As they approached it righted itself and came towards them with a gentle, lateral, undulating motion, showing its crest and part of the head above water. On being struck it made off with a vigorous *vertical* undulating motion, disappearing rapidly below the surface. It was brought to Newcastle next morning, and is the one described by Mr. Hancock and Dr. Embleton in the Annals of Natural History for July, 1849. Being destitute of teeth the creature is, of course, perfectly harmless, and probably feeds on minute crustacea and medusæ.

EXPLANATION OF FIGURES.

PLATE 145.—Fig. 1, side view of specimen, $\frac{1}{8}$ the natural size. Fig. 1*a*, head, $\frac{1}{4}$ natural size. Fig. 1*b*, posterior termination of specimen, natural size, showing the dorsal fin reduced to less than a line in height. Fig. 1*c*, granules of skin, magnified, to show crenulated circular base and central point. Fig. 1*d*, granules of skin, natural size. Fig. 1*e*, tubular scales of lateral line, natural size.

FREDERICK McCOY.

PLATE 146, FIG. 1.

CATENICELLA GEMELLA (McG.).

[Genus CATENICELLA (BLAINVILLE). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Catenicellidæ.)

Gen. Char.—Branches originating from the summits of each of a geminate pair, or rarely from the sides of ordinary zoœcia. Zoœcia in single series, but at a bifurcation geminate, or each internode consisting of a geminate pair; mouth with simple margins, straight or hollowed and entire below, or with a small, rounded notch.]

DESCRIPTION.—Each internode consisting of a geminate pair of zoœcia, each pair in the main stem giving origin to two double zoœcia, the one pair continuing the stem directly upwards, the other originating a lateral branch, these branches starting alternately right and left; the lateral branches mostly undivided, but occasionally giving off secondary branches; in the lateral branches, the geminate pairs giving off the next pair alternately from the right and left zoœcium; mouth large, lofty, straight below. Beneath the mouth a series of 5–7 fenestræ around an area continuous with that of the mouth, depressed at the margin and slightly bulging centrally; the mouth and fenestrate area surrounded by a thick margin; lateral processes large; at each upper angle a small, acuminate, chitinous process (possibly the mandible of a small avicularium); a minute, marginal, avicularium at the middle of each lateral process on the extremity of a tube-like mark; a small avicularium on a slight elevation between the zoœcia. Posterior surface umbonate and finely sulcate.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July 1886.

Port Phillip Heads, Mr. J. B. Wilson.

I have only examined two small specimens of this species, which is characterized by the *constant* gemination and peculiar arrangement of the zoœcia. The structure of the zoœcia is, however, precisely that of the geminate pairs in *C. alata*, including the anterior avicularia and the chitinous points on the upper angles; and I at first referred it to that species, an opinion which Mr. Waters has also expressed in a letter to me. I think it ought, in consideration of its peculiar colonial habit, to be ranked as a species, although it is quite possible that the examination of other specimens may show that it is merely a variety of *C. alata*.

EXPLANATION OF FIGURE.

PLATE 146.—Fig. 1, portion of branch magnified, anterior view.

PLATE 146, FIG. 2.

CATENICELLA URNULA (McG.).

DESCRIPTION.—Zoœcia vase-shaped; mouth slightly hollowed below; anterior surface with 7 large, shallow fenestræ; lateral processes large, erect, sharply pointed, frequently a small avicularium on the front of one or both, and a shallow hollow on the superior surface. Posterior surface with a narrow, vertical, thickened band, from which two processes extend on each side to the margin of the zoœcium, leaving three shallow depressions. Oœcia galeate, on the summit of zoœcia.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. B. Wilson.

This species is of a dark reddish-brown colour, and attains a large size, a tuft received from Mr. Wilson being 6 inches in height. It is allied to *C. plagiostoma* and *C. intermedia*, but is readily distinguished by its straight mouth, the shallowness of the fenestræ, the shape and structure of the avicularian processes, and the markings on the back of the zoœcia. The oœcia are large and terminal. The ovicelligerous zoœcium has a deep, rounded sinus in the lower lip of the mouth, and a very large operculum; the upper margin of the mouth is bordered by a thick rim, above which, on each side of the oœcium, is a broad depressed area. The back of the ovicelligerous cell is smooth, separated by a raised line from the oœcium, which has usually a transverse, elliptical depression and two somewhat quadrate, superior spaces, separated by raised bands. I have only examined dried specimens, and it is possible that the depressed areas may, in the living state, be level or even elevated.

EXPLANATION OF FIGURES.

PLATE 146.—Fig. 2, front view of small portion of branch, magnified. Fig. 2*a*, back view of same.

PLATE 146, FIG. 3.

CATENICELLA GRACILENTA (McG.).

DESCRIPTION.—Zoœcia much elongated, very narrow; mouth arched above and slightly hollowed below, or sub-circular; anterior surface papillose, posterior smooth;

a narrow, entirely lateral vitta extending the whole length of the zoœcium; lateral processes small, usually with a sharp angle above projecting outwards and forwards; a minute avicularium opening outwards on the outer edge. Oœcium cemented to the front of the zoœcium above, with a quadrate smooth area.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, Mr. J. B. Wilson.

In this small species the zoœcia are exceedingly slender. The oœcium, which is cemented to the cell above, as in *C. elegans*, *Buskii*, *fusca*, and some others, has on the front a smooth, quadrate area, totally different from the markings of any other species.

EXPLANATION OF FIGURES.

PLATE 146.—Fig. 3, anterior surface of portion of a branch, magnified. Fig. 3*a*, posterior view of same.

PLATE 146, FIG. 4.

CATENICELLA VENUSTA (McG.).

DESCRIPTION.—Zoarium small; branches very slender, crystalline. Zoœcia elongated, very narrow, with usually a sharp, barren process on one side and a thick aviculiferous one on the other; mouth sub-circular; a narrow, sub-lateral vitta extending about two-thirds of the length of the zoœcium; surface in front slightly papillose. Oœcia elongated upwards, adnate to the cell above, with a vertical thickened line (indicating the closure of a fissure), margin with a thickened rim, inside which is usually a series of white-bordered puncta.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. B. Wilson.

In this lovely species, the zoœcia are remarkably slender. The avicularian processes are directed upwards and forwards; one is usually sharply pointed and without avicularium, while the other is thicker, and is surmounted by a minute avicularium.

EXPLANATION OF FIGURES.

PLATE 146.—Fig 4, anterior view of portion of a branch, magnified; an oœcium shows the vertical fissure only partially closed. Fig. 4*a*, two zoœcia and mature oœcium. Fig. 4*b*, posterior view of portion of same branch.

PLATE 146, FIG. 5.

CLAVIPORELLA PULCHRA (McG.).

[Genus CLAVIPORELLA (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Catenicellidæ.)

Gen. Char.—Branches springing, usually, from the summits of the zoœcia of a geminate pair, but, occasionally, from the sides of single zoœcia. Zoœcia single or geminate; usually a large lateral process on each side above, supporting a large, gaping avicularium, occasionally small, altered or aborted; mouth narrow, arched above, contracted below, and extending downwards as a deep notch, giving the whole a key-hole appearance; usually several blunt, hollow processes above and to the side of the mouth.]

DESCRIPTION.—Zoarium very small; branches originating either from the summits of geminate zoœcia or from the sides of ordinary zoœcia. Zoœcia vase-shaped, with, usually, a wide lateral process on each side, turned slightly forwards and supporting a gaping avicularium; mouth narrow, with the oral sinus very narrow and with a tumid border; two blunt, mamilliform processes on each side of the mouth; a central, vertically-elongated pore in the front of the zoœcium, the rest of the surface papillose, with the papillæ generally larger in the neighbourhood of the central pore; posterior surface smooth.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

At once distinguished from the other species by the smaller and narrower zoœcia. It is the only species in which I have seen the branches originate from the sides of zoœcia.

EXPLANATION OF FIGURE.

PLATE 146.—Fig. 5, portion of branch showing the anterior surface, magnified.

PLATE 146, FIG. 6.

CLAVIPORELLA IMPERFORATA (McG.).

DESCRIPTION.—Zoarium small; branches originating from the upper extremity of each of the zoœcia of a geminate pair. Zoœcia broadly vase-shaped; a wide, gaping avicularium (frequently differing in size or wanting) at each upper angle; mouth rather wide, oral sinus small; two mamilliform processes on each side of the mouth; front of zoœcia papillose, usually a few of the papillæ towards the centre larger, and, when worn, forming pore-like marks, but no proper central pore. Posterior surface smooth. Oœcia galeate, tubercular, either surmounting the terminal zoœcium of a branch or one in its continuity; in the former case the upper outline rounded, in the latter a wide, gaping avicularium at each upper angle.

REFERENCE.—P. H. McGillivray, Trans. Roy. Soc. Vict., July 1886.

Port Phillip Heads.

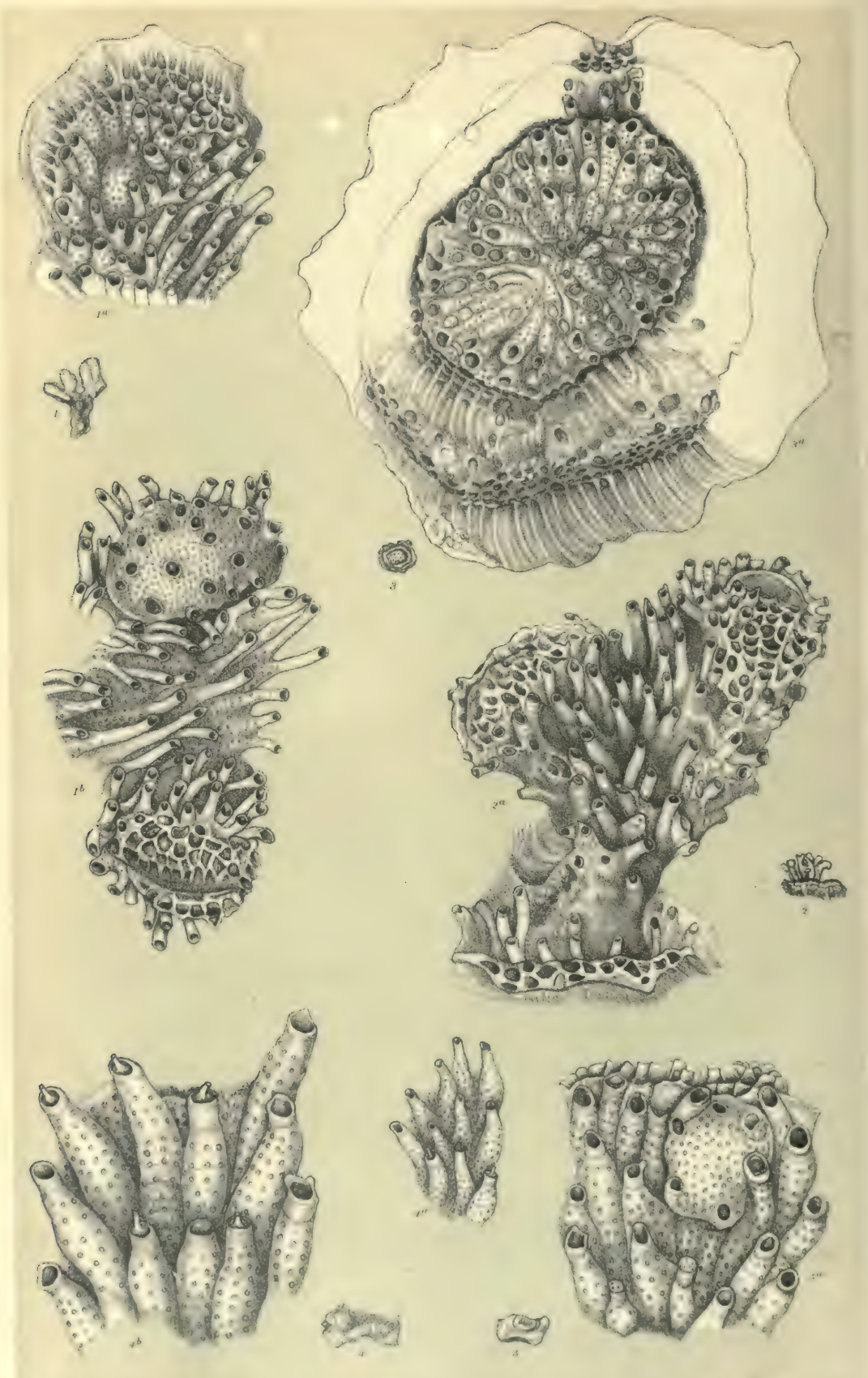
Closely allied to *C. aurita* (Busk sp.), but differing principally in the absence of the central foramen. The genus *Claviporella*, as proposed by me, differs from *Catenicella* in the peculiar key-hole form of the mouth, and from *Calpidium*, in which the shape of the mouth is somewhat similar, in wanting the overarching hood of that genus.

EXPLANATION OF FIGURE.

PLATE 146.—Fig. 6, portion of branch, anterior surface, magnified, showing also a terminal œcium and one in the continuity of a branch.

The specimens and descriptions of the Polyzoa on this Plate are from Mr. MacGillivray.

FREDERICK McCOY.



F.E.Ma. Gillray del.

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PLATE 147, FIG. 1.

DIASTOPORA CRISTATA (McG.).

[Genus DIASTOPORA (JOHNSTON). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Tubuliporidæ.)

Gen. Char.—Zoarium adnate, discoid or flabelliform, or wholly or partly raised and bilaminate. Zoœcia tubular, with an elliptical or sub-circular orifice, crowded and immersed towards the centre, more distinct and partially free towards the margins.]

DESCRIPTION.—Zoarium either encrusting and with portions raised into bilaminate lobes, or wholly bilaminate, the laminæ parted by a thin calcareous septum, the margin of which is produced beyond the zoœcia to form a crest-like ridge. Zoœcia crowded, free for a considerable extent; immersed portions separated by shallow grooves; surface finely and closely punctate, except the free part which is smooth or obscurely ringed; mouth circular or oblique. Oœcium a large inflation of the zoarium.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

In some specimens, as that figured of the natural size, the greater part of the zoarium is bilaminate, the lobes being large and only a small part encrusting. In others, as in that from which the magnified figures were drawn, the zoarium is mostly encrusting, frequently surrounding the calcareous tubes of annelids, and in parts rising into small bilaminate lobes. In the encrusting parts a thin, basal, calcareous membrane frequently extends beyond the zoœcia, and a similar membrane separates the layers of the bilaminate lobes. The zoœcia vary a good deal in size, in some parts being almost wholly immersed, while in others the free part is long and tubular.

In the Proceedings of the Linnean Society of New South Wales for 1881, is a contribution by Mr. Haswell, describing a species as *Mesenteripora repens* which may be identical with this, but there is no figure, and the description is scarcely sufficient for identification.

EXPLANATION OF FIGURES.

PLATE 147.—Fig. 1, bilaminate specimen, natural size. Fig. 1*a*, one surface of a lobe from another specimen, showing the extension of the calcareous septum. Fig. 1*b*, another portion of the same, showing an encrusting portion, a bilaminate lobe, and an oœcium.

PLATE 147, FIG. 2.

DIASTOPORA CAPITATA (McG.).

DESCRIPTION.—Zoarium consisting of bilaminate lobes, rising from an encrusting layer, by narrow, stem-like portions, and expanding above; lamina separated by a thin, calcareous septum, slightly produced beyond the zoœcia. Zoœcia indistinct at their lower parts, more or less free and tubular above, minutely punctate.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., March 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

The only specimen I have seen consists of a cluster of four lobes, rising from an encrusting layer of zoœcia. Each lobe is narrowed and thicker below, expanded, thinner and undulated above, and usually divided into two secondary lobes. The summit of the lobes is flatter than in the last, and cellular from the openings of imperfectly formed zoœcia. The zoœcia are not so numerous on the stem-like portion, but increase in number and prominence upwards, until towards the summit they are considerably elongated to assume a corymbose appearance. In the encrusting part a few of the zoœcia are closed, the lid having a minute perforation in its centre.

These two species are interesting, as clearly showing the unstable nature of the characters on which the genus *Mesenteripora*, as proposed by Blainville and generally adopted, is founded. Mr. Hincks has also, in the British Marine Polyzoa, united the two genera.

EXPLANATION OF FIGURES.

PLATE 147.—Fig. 2, specimen, natural size. Fig. 2*a*, one of the isolated lobes, magnified.

PLATE 147, FIG. 3.

DIASTOPORA BICOLOR (McG.).

DESCRIPTION.—Zoarium adherent, nearly circular, consisting of three parts: a central elevated portion composed of perfect zoœcia, surrounded by a broad fringe of imperfectly developed zoœcia, beyond which is a thin calcareous lamina; central portion red, much raised, flat and depressed at the centre; the remaining parts glassy.

Zoœcia arranged in distinct, irregular, radiating series, slightly rugose and thickly punctate; mouth oval or elliptical, with slightly thickened margin; in the marginal zoœcia open, most of the inner closed by a punctate or perforated plate; towards the centre are numerous rounded eminences, mostly at the commencement of series of zoœcia, and of the same width, punctate or perforated in the same manner, but presenting no trace of mouth. Surrounding fringe consisting of a broad layer of imperfectly developed zoœcia, and the thin lamina beyond marked with slight, radiating grooves, as occurs in the corresponding part of other species.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

I have only seen two specimens—the perfect one figured, and another not so complete.

EXPLANATION OF FIGURES.

PLATE 147.—Fig. 3, specimen, natural size. Fig. 3*a*, the same magnified.

PLATE 147, FIG. 4.

DIASTOPORA SARNIENSIS (NORMAN).

DESCRIPTION.—Zoarium thick, encrusting, and irregularly shaped, or partly free at the margin. Zoœcia large, distinct, arranged in irregular lines, a considerable part free, especially in those towards the margin; surface smooth or transversely corrugated, thickly punctate, except in the peristome; mouth circular or elliptical, in many of those towards the centre closed by a calcareous plate, with a central, raised, tubular opening.

REFERENCE.—Hincks, Brit. Mar. Polyzoa, p. 463, pl. lxvi., figs. 7–9.

Port Phillip Heads.

This species varies a good deal in size and shape. The zoœcia are thick, usually pretty prominent and free; the curious cover when present gives a ready means of distinction from the other species. I have not seen the oœcia, but they are described by Mr. Hincks as "transversely elongated, subelliptical inflations of the zoarium, of considerable size."

EXPLANATION OF FIGURES.

PLATE 147.—Fig. 4, specimen, natural size. Fig. 4*a*, portion magnified. Fig. 4*b*, portion of same more highly magnified, showing the calcareous plates closing the orifices of several of the zoœcia.

PLATE 147, FIG. 5.

DIASTOPORA PATINA (LAMARCK, SP.).

DESCRIPTION.—Zoarium small, thin, usually more or less circular or elliptical, surrounded by an extension of the basal lamina. Zoœcia stout, thickly punctate, crowded, more immersed towards the centre, in more or less radiating lines towards the circumference and usually open; orifice in the central zoœcia elliptical or round and frequently closed by a minutely perforated calcareous plate, in those towards the margin elliptical or produced on one side. Oœcium a large inflation of the zoarium.

REFERENCE.—Hincks, Brit. Mar. Poly., p. 458, pl. lxvi., figs. 1–6.

Port Phillip Heads.

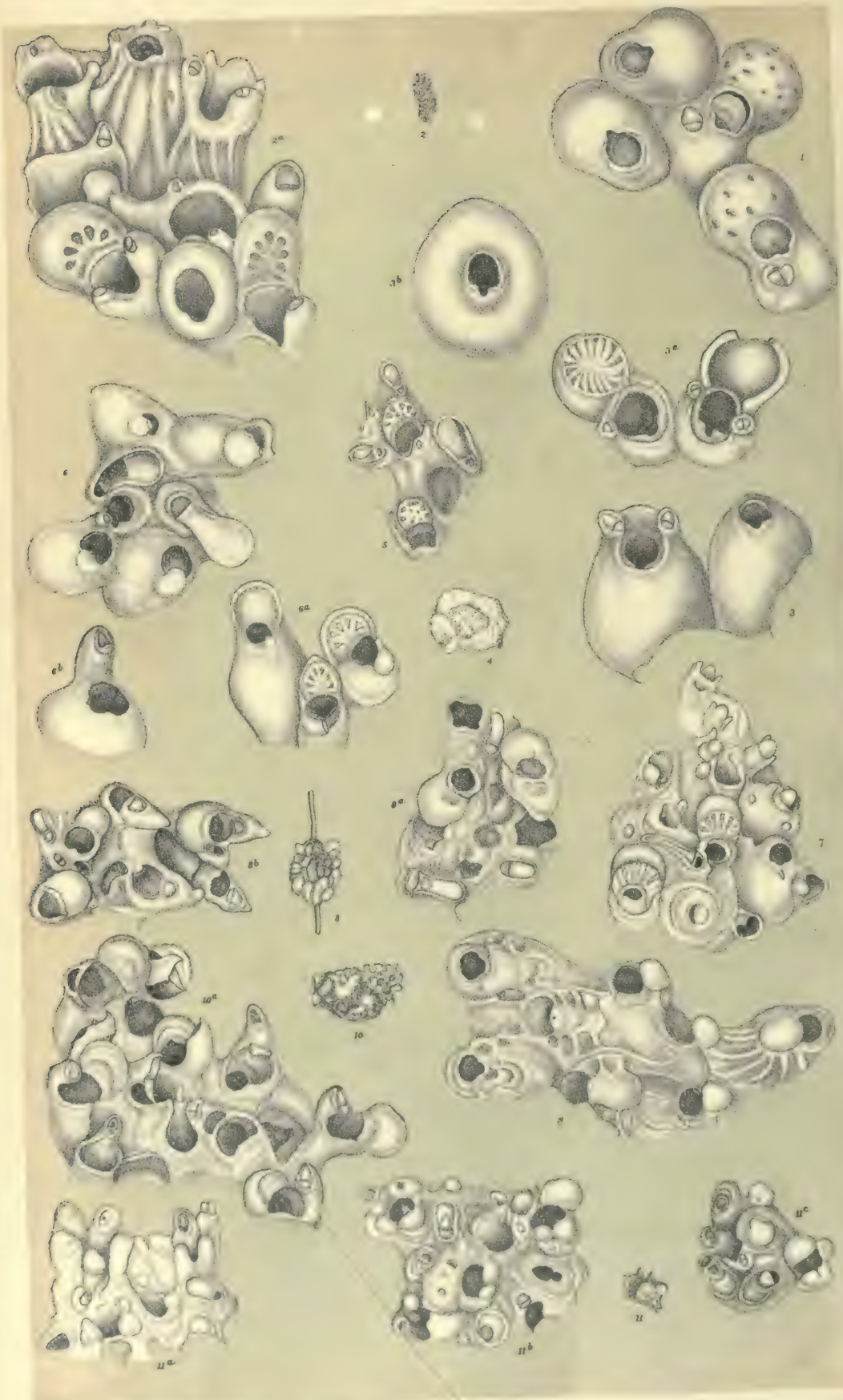
The specimens I have examined of this species are all small, silvery and encrusting. In Europe, where it is abundant, it seems to vary very much, being sometimes caliculate and partly free, and occasionally proliferous at the margins. A full account of these forms is given by Mr. Hincks.

EXPLANATION OF FIGURES.

PLATE 147.—Fig. 5, specimen, natural size. Fig. 5*a*, portion of same magnified, showing two central zoœcia closed by perforated plates and an oœcium.

The specimens and descriptions of our *Diastoporæ* on this plate I owe to Mr. MacGillivray.

FREDERICK MCCOY.



Mintern Bros. lith. Melbourne

PLATE 148, FIG. 1.

CELLEPORA MEGASOMA (McG.).

[Genus CELLEPORA (FABRICIUS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Celleporidæ.)

Gen. Char.—Zoarium encrusting, partly adnate, massive, foliaceous, erect and ramose, or glomerulous. Zoœcia, in the older parts more or less erect and irregularly heaped together; one or more rostral processes (occasionally absent), usually bearing avicularia, in the neighbourhood of the mouth. Generally scattered vicarious avicularia.]

DESCRIPTION.—Zoarium encrusting. Zoœcia ovoid, irregularly arranged, frequently bulging below, and with an imperfect umbo. Mouth arched above, about as high as wide, with a sinus in the lower lip. Scattered avicularia, frequently a small one, with a nearly semicircular mandible, below or to one side of the mouth. Oœcia large, rounded, granular or pitted.

REFERENCES.—P. H. MacGillivray, *Lepralia megasoma*, Prod. Zool. Vict., plate 38, fig. 5; *Cellepora megasoma*, Trans. Roy. Soc. Vict., 1884.

Port Phillip Heads.

Forms an encrusting zoarium, occasionally of large size, one specimen measuring 2 inches by 1½ inches. The marginal zoœcia are decumbent, and I believe it was a cluster of these that I described as *Lepralia megasoma*. The others are more or less elevated. There is no proper mucro. The surface of the zoœcia is normally smooth, but in portion of one specimen in which most are so, a number have a series of longitudinal elevated ribs extending the whole length.

EXPLANATION OF FIGURE.

PLATE 148.—Fig. 1, small group of zoœcia, magnified, showing also two pitted oœcia; the oral sinus is not generally so sharply defined.

PLATE 148, FIG. 2.

CELLEPORA COSTATA (McG.).

DESCRIPTION.—Zoarium small, encrusting or attached to algæ or zoophytes. Zoœcia large, very irregular, mostly erect, surface strongly ribbed; mouth lofty, arched above, with a deep rounded sinus in the lower lip; two or more stout, thick processes at its sides, rounded at the summits and surmounted on the inner side by a conspicuous oval avicularium. Oœcia rounded, with a mitriform or semicircular sculptured area.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1868.

Port Phillip Heads; Wilson's Promontory; Portland, Mr. Maplestone; Warrnambool, Mr. Watts.

This species is of frequent occurrence, and is found in small masses usually attached to Polyzoa and Hydrozoa. The zoœcia are very irregular, distinct, and mostly nearly erect. The surface is beautifully fluted, with prominent convex ribs extending from the mouth to the base. These are sometimes thicker above, forming a prominent ridge round the mouth. There are usually two (occasionally more) thick, erect, calcareous processes at the sides of the mouth, either smooth or fluted like the surface of the zoœcia. Each is surmounted, towards the inner side, by an oval or elliptical avicularium, with the mandible directed downwards. There are also, occasionally, larger vicarious avicularia, on elevated calcareous processes, with nearly semicircular mandibles. The oœcia are of considerable size, extending nearly horizontally from the upper edge of the mouth. They are rounded, occasionally smooth, but mostly with a sculptured area. These markings are usually shallow, but in old specimens are much deeper and more numerous, and the area then has a sharply defined margin.

EXPLANATION OF FIGURES.

PLATE 148.—Fig. 2, specimen, natural size. Fig. 2*a*, portion magnified, showing zoœcia previous to growth of oral processes; one with processes commencing to grow, and the others with one or two fully developed. The oœcia are of the usual appearance. A large vicarious avicularium is seen on the right.

PLATE 148, FIG. 3.

CELLEPORA ROTA (McG.).

DESCRIPTION.—Zoarium encrusting. Zoœcia irregularly arranged, nearly erect, more or less globose, surface smooth or pitted; mouth with a deep sinus in the lower lip; on each side of the mouth an elevated process, surmounted by a short broad avicularium, the mandible broadly triangular with an obtuse point. Oœcia much raised, with a nearly circular, defined area marked by radiating grooves.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec. 1884.

Port Phillip Heads.

Allied to *C. costata*, with which it has been united by Mr. Waters, but certainly distinct. The zoœcia are distinct, little

prominent, in older specimens nearly globose. The surface is smooth or pitted, the pits occasionally, near the mouth, giving an obscurely ribbed appearance. The peristome forms a thin rim, with occasionally a prominence on each side, on the summit of which is an oval or broadly elliptical avicularium, the mandible directed upwards and outwards.

EXPLANATION OF FIGURES.

PLATE 148.—Fig. 3, two zoœcia from the growing edge. Fig. 3*a*, two zoœcia, with growing and mature oœcia. Fig. 3*b*, vertical view of zoœcium to show the mouth.

PLATE 148, FIGS. 5–6.

CELLEPORA COSTAZEI, VAR. (AUDOUIN).

DESCRIPTION.—Zoarium encrusting. Zoœcia ovate, smooth, irregularly arranged, confused; mouth wide, with a broad rounded sinus in the lower lip; usually a prominent mucro below the mouth, supporting a small avicularium and occasionally an aviculiferous process from the peristome on one or both sides. Numerous scattered avicularia, some very large, with broadly expanded spatulate mandibles. Oœcia of moderate size, with a rounded or mitriform area, bounded by a distinct, raised margin, pitted or sculptured in a radiate manner.

REFERENCES.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1884; typical form, Hincks, Brit. Mar. Pol., p. 411, pl. 55, figs. 11–14; typical form, *C. Hassallii*, Busk, Brit. Mus. Cat. Mar. Pol., pt. ii. p. 86, pl. cix., figs. 4–6.

Port Phillip Heads.

There may be some doubt as to the identification of this with the European species. It differs in the general absence of the elevated avicularia on the sides of the mouth, which are only occasionally found on one side. In an English specimen, however, they are also absent in many of the zoœcia. The sub-oral mucro is also generally wanting in English specimens. The vicarious avicularia are also larger in the Australian form. I had at first intended to describe it as a new species under the name of *C. spatula*, which may be retained as that of the variety.

EXPLANATION OF FIGURES.

PLATE 148.—Fig. 5, portion of specimen, magnified. Fig. 6, portion of another specimen. Fig. 6*a*, oœcia of same. Fig. 6*b*, single zoœcium, with avicularium on high process.

PLATE 148, FIG. 7.

CELLEPORA PLATALÆA (McG.).

DESCRIPTION.—Zoarium very small, pisiform, glassy. Zoœcia very small, rounded, irregularly heaped; mouth slightly hollowed below, but without a distinct sinus; frequently a broad sub-oral mucro. Avicularia with very long, slender spatulate mandibles. Oœcia globular, with a distinct arched area with radiating grooves.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads, and probably common.

A very minute species, distinguished by the markings on the area of the oœcium, and the very long, narrow avicularia.

EXPLANATION OF FIGURE.

PLATE 148.—Fig. 7, portion of specimen, magnified.

PLATE 148, FIG. 8.

CELLEPORA GLOMERATA (McG.).

DESCRIPTION.—Zoarium very small, pisiform, glomerular, attached to stems of zoophytes. Zoœcia very irregularly heaped; mouth with a shallow sinus in the lower lip; in young zoœcia a long superior mucro with a sessile avicularium on the inner aspect; in older zoœcia a short, thick, sub-oral mucro with a small avicularium at the summit or internally; scattered vicarious avicularia, with broadly spatulate mandibles. Oœcia small, globular, smooth and glossy, or occasionally (when young) with a small mark on the front.

Port Phillip Heads, on Zoophytes.

A minute species, distinguished by its glomerulate mode of growth, the smooth oœcia, and the broadly spatulate avicularia.

EXPLANATION OF FIGURES.

PLATE 148.—Fig. 8, specimen, natural size. Fig. 8*a*, portion of same, magnified, showing young oœcia and avicularia. Fig. 8*b*, portion of same, showing marginal zoœcia with superior processes.

PLATE 148, FIG. 9.

CELLEPORA VITREA (McG.).

DESCRIPTION.—Zoarium small, encrusting, glassy. Zoœcia elongated, distinct, horizontal at the margins, more confused centrally; margins areolated or surface traversed by prominent glassy ribs; mouth with a rather wide and not very deep sinus on the lower lip; a large, broad, smooth mucro below the mouth.

Port Phillip Heads, a single specimen, Mr. J. B. Wilson.

I have some doubt whether to refer this species to *Cellepora* or *Schizoporella*. The marginal zoœcia are quite horizontal, those further removed confused, but not so erect as usual in *Cellepora*. The sub-oral rostrum seems to be unarmed, but it is possible that there may be an avicularium on its internal surface. I have another specimen which seems to belong to the same species. In it the zoœcia are shorter, some smooth, but others with glassy elevations, the sub-oral process rises and curves forward, or occasionally inclines to one side, and has a small avicularium on the inner surface towards the summit. The oœcia are rounded, with a small, nearly circular area, punctate within the margin. There are also several vicarious avicularia with spatulate mandibles. This latter specimen agrees with Busk's *C. signata* of the "*Challenger*" Polyzoa in the markings of the oœcia and the vicarious spatulate avicularia, but differs in the sub-oral mucro and in the wider and shallower sinus.

EXPLANATION OF FIGURE.

PLATE 148.—Fig. 9, portion of specimen, magnified.

PLATE 148, FIG. 10.

CELLEPORA TIARA (McG.).

DESCRIPTION.—Zoarium minute, encrusting. Zoœcia small, rather short, smooth, confused; primary mouth with a rather deep, narrow, slit-like sinus; peristome considerably developed, with a stout, thick mucro at one side, usually slightly overarching the mouth, and surmounted by a comparatively large avicularium with broadly triangular mandible. Oœcia sub-globular, reclinate, with a sub-triangular, smooth, or sculptured area.

Port Phillip Heads.

The few specimens I have are all growing on *Retepora monilifera*. It is distinguished by the thick, incurving oral mucro and the character of the area on the front of the oœcium.

EXPLANATION OF FIGURES.

PLATE 148.—Fig. 10, specimen, natural size, encrusting Retepore. Fig. 10*a*, portion of ame, magnified. In all the zoœcia the primary mouth is obscured by the peristome.

PLATE 148, FIG. 11.

CELLEPORA BENEMUNITA (McG.).

DESCRIPTION.—Zoarium small, encrusting. Zoœcia small, confused, heaped; primary mouth with a sub-oral sinus; several short, thick processes developed in the neighbourhood of the mouth, surmounted by small avicularia with spatulate or linguate mandibles. Numerous vicarious avicularia, with broadly spatulate mandibles. Oœcia small, sub-globular.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

The only specimen I have seen is very small. It is readily distinguished by the numerous short, glassy processes (many surmounted by avicularia) in the neighbourhood of the mouth, the numerous vicarious avicularia, and the smooth oœcia.

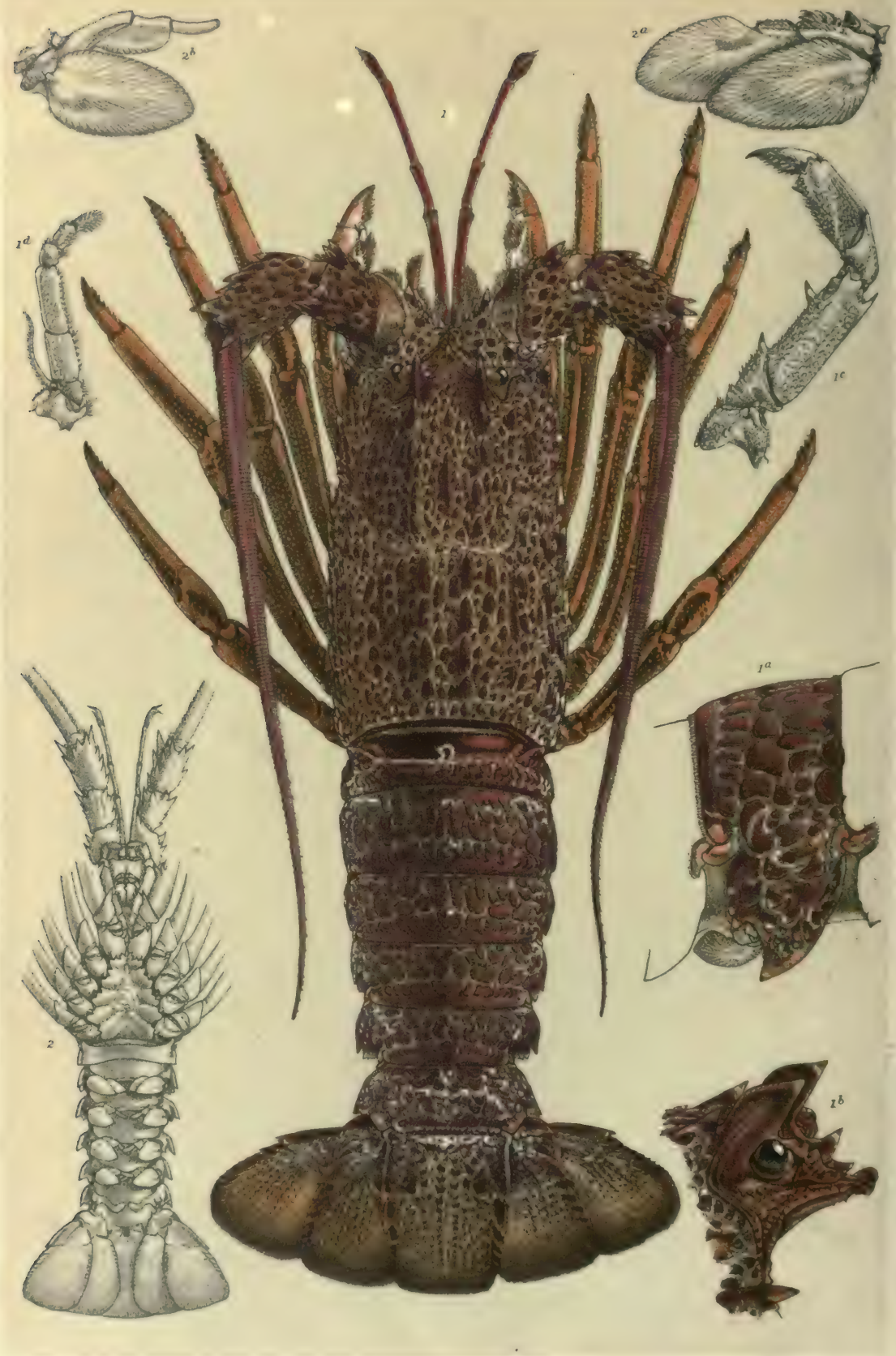
EXPLANATION OF FIGURES.

PLATE 148.—Fig. 11, specimen, natural size. Fig. 11*a*, portion from a growing edge, magnified. Fig. 11*b*, other portions of the same.

Figures of the opercula and avicularian mandibles will be given when the remaining Celleporæ are described.

The important genus *Cellepora* illustrated on this plate continues a series, the specimens and descriptions of which have been contributed to the National Museum and this work by Mr. MacGillivray.

FREDERICK McCOY.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PLATES 149 AND 150.

PALINURUS LALANDI (LAM. MSS.).

SOUTHERN SPINY LOBSTER (MELBOURNE CRAWFISH).

[Genus PALINURUS (FABR.). (Restricted to Milne Edwards, first section, with rostrum, &c.). (Sub-kingdom Articulata. Class Crustacea. Order Decapoda. Section Macroura. Tribe Astacidea. Family Palinuridæ.)

Gen. Char.—Carapace subcylindrical, broadly rounded on sides, with a small rostrum. Antennary segment very narrow above. Antennæ without basal scale, nearly in contact at base, covering the inner antennæ; basal joints long, subcylindrical, flagella of inner antennæ very short. Anterior legs monodactyle. Sternum trigonal.]

DESCRIPTION.—*Male:* Carapace covered with large, flattened, ovate, sub-spinose tubercles, each with a narrow fibrous fringe on front and sides; two rows of narrow and more pointed spines extending backwards from each supraocular spine, largest in front, and four or five extending half-way back on sides from a large spine in middle of front lateral margin, and a few similar ones irregularly scattered. Two supraocular spines, large, smooth, inclining obliquely forwards, with a straight front edge and convex posterior edge. Rostrum small, more advanced than the supraocular spines, but not reaching front edge of carapace, varying from straight and horizontal (which is rare) to much arched upwards (which is the most common), and straight and pointed vertically upwards (which is the least common); on each side of base of rostrum a lunate extension, with its posterior spine directed upwards and its anterior spine upwards and forwards. Abdominal segments with three or four irregular transverse rows of large, flattened, scale-like tubercles, very irregular in size and shape, each fringed with short fibres; each segment ending laterally in a large compressed spine arched backwards, behind which is one small, strong, flattened spine, the edge beyond which is usually smooth, but sometimes showing two to five small tooth-like serratures; anterior legs with a small conical spine at distal lower edge of penultimate joint; no spine on antepenultimate joint; a very large, conical, compressed spine on anterior third of lower edge of third joint; the largest conical spine on anterior lower edge of second joint of first pair of legs, with from one to four very small ones on ridge immediately behind its base; all the five legs have the upper ridge of third joint terminating in a sharp, conical spine directed forwards; rarely there is a very small spine at the inner base of the constant ridge-spine on some of the legs, and, still more rarely, a third small spine on outer edge. *Colour:* Dorsal aspect of carapace rich, brownish purple-madder, the fringed edges of scale-shaped tubercles lighter yellowish-brown; rostrum and superciliar spines redder and tipped with light orange-red; lateral portion of hepatic region whitish, with tubercles of colour of back; an irregular, narrow, whitish line from anterior end of nuchal furrow to posterior lateral angle of carapace; large antennæ nearly colour of back, more pink, fringed edges of joints lighter, and with spines on basal portion tipped with orange-red; smaller antennæ colour

of back with the distal ends of joints orange-red. Legs with tubercles, ridges and extremities bright orange-red, relieved by a depressed ground colour, like back, on the sides; inner portion of penultimate joint, and of all the others, except the terminal and antepenultimate joint of anterior leg, whitish; sternum and basal joint of other legs whitish on tubercles and prominent parts, with a purplish colour, like back, as ground colour on depressed portions. Abdomen same purple-madder colour as carapace, with the lateral spines tipped with bright orange red; tail fins dull orange in middle, with longitudinal rows of tubercles and margins of purple-madder of back, becoming darker at distal end; narrow lateral ridge and points of tubercles on lateral edges orange-red. *Measurements:* Total length from tip of snout to end of tail flaps, 1 ft. 6 in. Proportional measurements to total length, as 100:—Length of thorax, $\frac{37}{100}$; length from thorax to penultimate joint of abdomen, $\frac{44}{100}$; greatest width of thorax, $\frac{37}{100}$; depth of thorax, $\frac{17}{100}$, greatest width of abdomen, $\frac{20}{100}$; length of telson, $\frac{19}{100}$; greatest width of telson near end, $\frac{15}{100}$; length of first three joints of outer antennæ, $\frac{30}{100}$; width of ditto, $\frac{7}{100}$; length of flagella of outer antennæ, $\frac{75}{100}$; length of rostrum, $\frac{3}{100}$; length of supraorbital spines, $\frac{5}{100}$; length of first joint of inner antennæ, $\frac{15}{100}$; second joint, $\frac{8}{100}$; third joint, $\frac{10}{100}$; flagella, $\frac{6}{100}$; length of first pair of legs, $\frac{47}{100}$; second pair, $\frac{60}{100}$; third pair, $\frac{70}{100}$; fourth pair, $\frac{60}{100}$; fifth pair, $\frac{50}{100}$; greatest width of first leg (at middle of penultimate joint), $\frac{7}{100}$. *Female:* The last pair of legs subchelate by the large conical upcurved spine on lower margin of anterior edge; the spines on lower surface of joints of anterior pair of legs are smaller than in the male of same size, especially those on the penultimate joint; the rostrum is also a little smaller than in the male, which it otherwise resembles.

Reference.—Milne Edw. Hist. Crust., v. 2, p. 293; =*P. Edwardsi*, Hutton An. Nat. Hist., Jan. 1875, p. 42; =*P. Paulensis*, Heller Verhandlungen der K. K. Zool. Bot. Gesellschaft in Wien 1862, p. 525.

This fine and very interesting species has not been properly figured before, and is consequently a source of some perplexity to naturalists. It was first described from the Cape of Good Hope by Prof. Milne Edwards, from the specimens in the Paris Museum named in manuscript *P. Lalandi* by Lamarck; and, many years ago, the late Dr. Gray and Mr. Adam White in their "List," published in 1847, referred two specimens in the British Museum to it, one from New Zealand and one from S. Africa. Capt. Hutton subsequently described the New Zealand *Palinurus* under the name of *P. Edwardsi*, distinguishing it from *P. Lalandi* by its smaller size ($9\frac{1}{2}$ in.), by the upcurved beak (said by him to be straight and conical in *P. Lalandi*), in having no spine on the penultimate joint of the anterior legs, and in having a second small spine at the distal extremity of the third joint of the last four pairs of legs. In the female of *P. Edwardsi* the rostrum is said by Prof. Hutton to be wanting.

As I have always referred our species to the *P. Lalandi*, and believed it to be identical with the New Zealand and Tasmanian, as well as the South African one, I felt obliged to investigate those supposed differences carefully. On going to the British Museum I found, after some difficulty, the specimens (one presented by Dr. Andrew Smith, from the Cape of Good Hope, and the New Zealand one from Mr. Percy Earl's collection) referred by Gray to *P. Lalandi* (now re-labelled *P. Edwardsi*) and found the New Zealand and the Cape specimens belonged clearly to one species, and, as I had many years ago published the belief, identical also with the Victorian species. I here also found a specimen sent to the Indian and Colonial Exhibition from the New Zealand Government as *P. Edwardsi*, about twice the size mentioned by Prof. Hutton, and agreeing in this respect with our ordinary examples and the size (15 in.) published by Milne Edwards for the original types of *P. Lalandi* from the Cape; so that difference of size does not hold even in New Zealand. The second characteristic of *P. Edwardsi*—having the rostrum curved upwards, instead of straight, as said by Capt. Hutton of *P. Lalandi*—gave me much trouble, as the shape of the rostrum is not mentioned by Milne Edwards in his work for Lamarck's species, and so I thought it necessary to go to Paris to examine the original type in the *Jardin des Plantes Museum*, and having, with the kind assistance of Dr. Fisher, found the original specimen, I ascertained that the rostrum curved gently upwards in the S. African type.

I figure now our most common upward-curved rostrum (Plate 149, fig. 1*b*), and the much rarer, perfectly straight, horizontal rostrum (Plate 150, fig. 2), between which the original Cape type specimens in the Paris Museum, as well as by far the greater number of our Victorian ones, are intermediate. One of our Victorian female specimens has the rostrum straight, but directed almost vertically upwards (Plate 150, fig. 1). The females of *P. Edwardsi* are said by Capt. Hutton to have no rostrum ; in our specimens (except occasional absences from malformation in both sexes) the female has the rostrum as in the male, but rather smaller, as is true generally of all spines. As to the existence of a small, anterior, second spine at the distal extremity of the third

joint of the last four pairs of legs, given as a characteristic difference of *P. Edwardsi* from *P. Lalandi*, I find, although usually absent in our species, it is sometimes present, and sometimes present on some of the legs and absent on others of the same individual, as represented on Figs. 3 and 3*a* of our Plate 150, in which the two last pairs of legs have them, and those in front have not. This is, therefore, obviously not a constant character, and a few specimens show a third small spine on the outer edge of the same part. All the spines are smaller, proportionally, in small specimens, and that on the inner side of the penultimate joint of the anterior pair of legs may occasionally disappear in so small an example (9·5 in.) as that described by Capt. Hutton. Our figure, Plate 149, fig. 1*c*, shows how small it is in a specimen a foot long, and our figure Plate 150, fig. 6, shows the much greater development of the spines at the more nearly adult size of 18 in. in total length. This being so, I think it might be so small in a 9 inch specimen as to almost warrant the statement that it was absent, and raises a doubt on this distinctive character when individuals of very different sizes are compared.

I suggest the trivial name of Southern Rock Lobster for this species, which, abounding in Victoria, Tasmania, and New Zealand, as well as the Cape of Good Hope, (and St. Paul's, according to Heller,) does not appear to have been noticed as far north as Sydney, where it is replaced by a totally different species, the Common Sydney Crawfish *P. Hügelli*, of which I have one specimen from our coast and one from Tasmania, as excessively rare occurrences as stragglers.

Very abundant in pools on the rocky coasts of Victoria, and is the common Melbourne Crayfish of the fishmongers.

Explanation of Figures.

Plate 149.—Fig. 1, immature specimen, half the natural size, viewed from above. Fig. 1*a*, half of third abdominal segment, natural size, showing the flattened, scale-like tuberculation, with two serratures behind the large spine on posterior edge of pleura. Fig. 1*b*, ordinary shape of upward-arched rostrum, natural size. Fig. 1*c*, anterior leg with moderately developed spines on inner edge of second, third, and penultimate joints, half the natural size. Fig. 1*d*, jaw-foot, half the natural size. Fig. 2, underside of female, one-quarter the natural size, showing the trigonal sternum. Fig. 2*a*, appendage of second abdominal segment of female, showing the two large laminæ, natural size. Fig. 2*b*, appendage of third abdominal segment, with one, large, membranous lamina, natural size.

PLATE 150.—Fig. 1, portion of female, showing a straight-edged rostrum with an unusual direction, nearly vertically upright and a little forward, natural size. Fig. 2, portion of a male specimen, showing a straight-edged rostrum with a nearly horizontal upper edge, directed forwards and very slightly upwards, natural size. Fig. 3, distal end of third joint of third leg, showing the usual single spine, natural size. Fig. 3*a*, distal end of third joint of fourth leg of same specimen as fig. 3, showing the comparatively rare, second, anterior, smaller spine, supposed characteristic of *P. Edwardsi*, found on the fourth and fifth legs of this specimen, but not on the second or third. Fig. 4, distal end of third joint of fourth leg of another specimen, showing the more common, single spine of same leg. Fig. 5, last or fifth leg of female, showing sub-chelate character, natural size. Fig. 4*a*, same hind or fifth leg of male, showing its simple termination, natural size. Fig. 6, claw or anterior leg of old male, natural size. Fig. 7, outer end of third segment with the posterior edge behind the spine, smooth and destitute of spines or serratures, natural size. Fig. 8, outer ends of second and third abdominal segments of another specimen, showing three and five serratures respectively on posterior edge behind the spine. Fig. 9, female appendage of second abdominal segment, natural size. Fig. 9*a*, ditto of third abdominal segment.

FREDERICK MCCOY.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XVI.

BY

FREDERICK McCOY, C.M.G., M.A., Sc.D. CANTAB., F.R.S.,

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PREFACE.

THIS sixteenth Decade gives an illustration, of the natural colors of life, of the beautiful species of Monitor Lizard, *M. Gouldi*, from the warmer latitudes of the colony, allied to the large Lace Lizard, or so-called Iguana, *Hydrosaurus varius*, figured on our Plate 41, of the districts nearer the Southern coast.

The next two plates illustrate two genera (*Pygopus* and *Delma*) of those extraordinary Snake-shaped Lizards without feet, popularly supposed, both by the aborigines and settlers, to be highly poisonous snakes, although perfectly harmless.

Plate 154 gives a figure from the recent specimen, of the natural colors, of the rare gigantic Mackerel, the *Cybium Commersoni*, of which only one example has been found on our coast.

The next plate illustrates another fine species of large, food fish, one of the *Pelamyds*, nearly allied to one from Japan, but which I have named *Pelamys Schlegeli*, to recall that fact, and on account of differences which I have published.

The next three plates illustrate rare and interesting Polyzoa from our coast, the specimens and descriptions of which Mr. MacGillivray has given for the Museum and this work.

Plate 159 illustrates the common Sydney Craw-fish, *Palinurus Hügeli*, showing the colors of life for the first time; one of the rarest crustacea of our coast. This is replaced in Victoria by the Southern Spiny Lobster or "Common Melbourne Craw-fish,"

Palinurus Lalandi, figured in our fifteenth Decade, which, I have no doubt, is identical with the species of the Cape of Good Hope and New Zealand, but not recorded from New South Wales or any place much north of Victoria. By comparison with South African specimens, I have confirmed my previously published opinion of the identity of the South African and Victorian species.

The last plate illustrates, what I believe to be, a local variety of the "Murray Spiny Lobster" or large Murray Cray-fish, *Astacopsis serratus*, found abundantly in the Yarra and the streams flowing into it. I have given the name *Yarraensis* to this variety, which, from its small size and bright blue color, is very unlike the large northern Murray form, the illustration being desirable, as the majority of the fishes and other inhabitants of the Murray are different from those found in the rivers running southwards, as the Yarra does.

The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest, and of which good figures do not exist, or are not easily accessible.

FREDERICK McCOY.

22nd June, 1888.*

* Pressure of other business at the Government Printing Office, and the removal to new building, have delayed the publication of this Decade.

ZOOLOGY OF VICTORIA
(*Reptiles*)

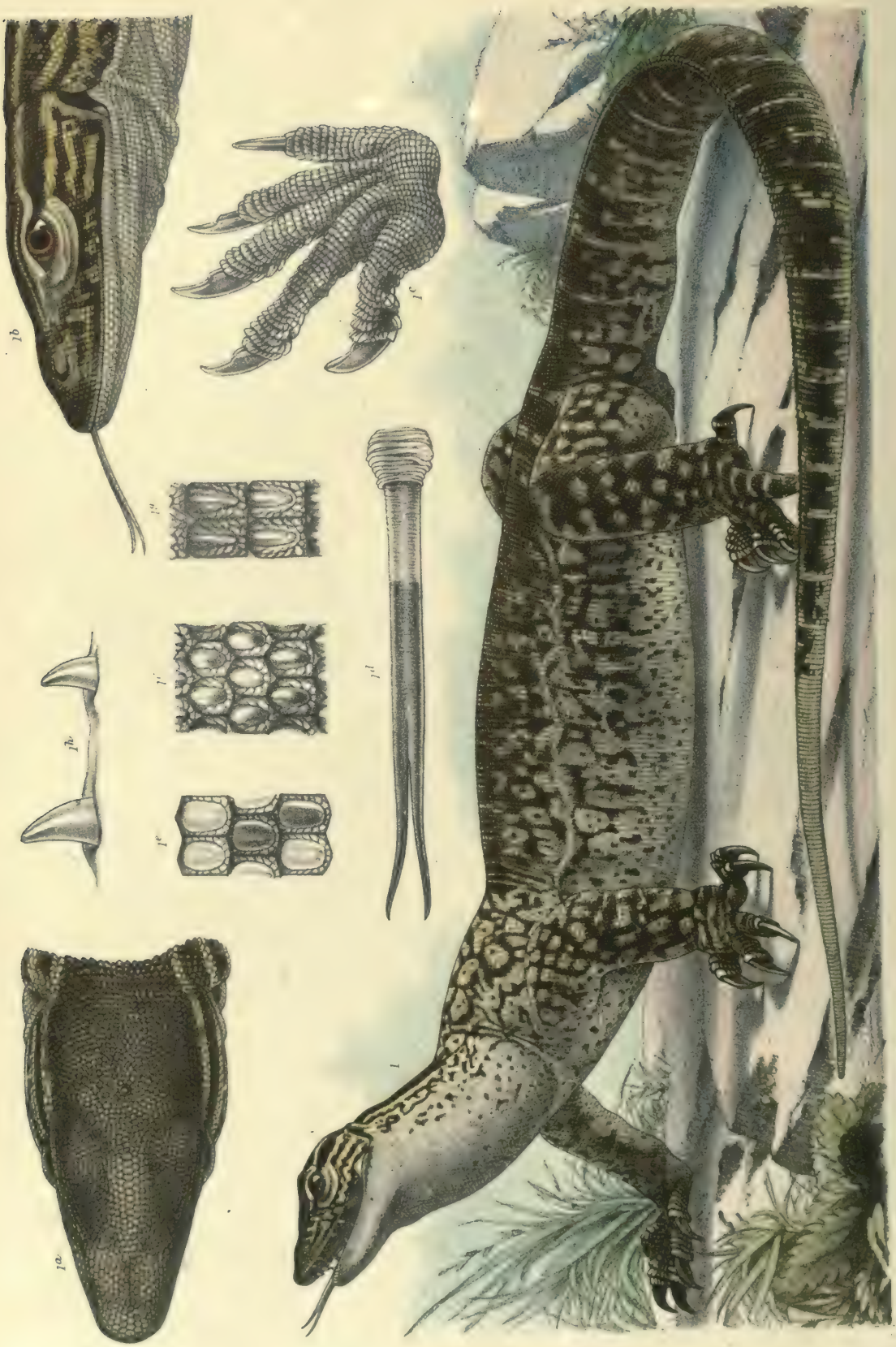

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PLATE 151.

MONITOR GOULDI (GRAY).

GOULD'S MONITOR LIZARD.

[Genus MONITOR (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Section Squamata. Sub-order Leptoglossæ. Tribe Cyclosaura. Family Monitoridæ.)

Gen. Char.—Body fusiform, covered with small, quadrate scales in small, transverse bands on back and belly, tubercular, each on upper surface surrounded with rows of small granules; one small, transverse fold at base of neck, in front of shoulders; tail long, tapering, compressed, with whorls of small scales, and a double scaly keel above. Head moderate, covered with very small, polygonal plates; tongue very long, narrow, slender, flattened, deeply forked, with two horny, cylindrical tips at distal end, and lodged in a cylindrical sheath at base; eyes diurnal, pupil circular, with two valvular eye-lids; scales over the eye equal; ear-drums large, with simple edges; legs strong, for walking; toes, five on each foot, elongate, unequal, compressed, strong, with large curved claws; thighs without pores; no preanal pores; nostrils about half-way between tip of snout and front edge of eye. Teeth compressed, pointed, distant, smooth, anchylosed to inner edge of jaw-bones by outer surface.]

DESCRIPTION.—Body elongate, ovate, slightly depressed; neck long, cylindrical. Head ovate, flattened and subtriangular above; sides in front of eye flattened, vertical, nearly at right angles with upper surface, tapering with straight sides to narrow rounded muzzle. Nostrils longitudinally triangular, hind edge slightly nearer to tip of snout than to eye; plates on eye-lids, sides, and top of head, very small, sub-equal, polygonal, smooth; vertex plate* rounded, about three times the length of adjacent plates. Tail about one-third longer than the body, moderately compressed laterally; double keel formed of two rows of triangular scales, commencing nearly at base, greatest height at about one-fourth the length of the tail from the base, each scale a little longer than its vertical, highest posterior end, and having other scales on the sides, gradually passing into the size and shape of the ordinary scales of the sides of the tail. *Teeth* small, smooth, compressed, the sharp anterior and posterior edges nearly smooth, moderately arched backwards, far apart, about six in upper and about four or five in lower jaw. *Scales* of upper surface of neck, body, and limbs formed of a convex, longitudinally oval, tubercle in middle, surrounded by several rows of small granules; more elongate, keeled, and triangular on tail, with the rows of granules chiefly towards the distal end; on belly, flat, oblong, a little longer than wide, with about one row of small granules round each. *Color:* Above, brownish-black, with seventeen or eighteen transverse rows of irregular, rounded or quadrate, pale-yellow spots, about from three to ten scales long, ocellated or with black centres over shoulders and on sides, plain on middle of back, more definite and rounded on upper sides of limbs. About 23 narrow, transverse, yellow bands on tail, from one to three scales wide, the black intervals from five to ten scales wide, terminal fourth of tail plain pale-yellow; under-side of neck, belly, tail, and limbs pale-yellow, with small, scattered, quadrate, black spots; throat clouded with pale-blue, without black spots; top of head plain brownish-black; sides of head mottled, yellow and black; yellow on upper eye-lid extending backwards as a distinct narrow streak beyond and above the ear; yellow of lower eye-lid extending as a broader, distinct, narrow streak over top of ear nearly to shoulder;

* Probably indicating the position of the "Pineal Eye."

nape black, slightly freckled with small yellow spots. Iris orange. Tongue dull-blackish-blue or lead-color; sheath and base cream-color, like interior of mouth. Toes strong, the scales arranged in transverse, angular, prominent ridges below; soles with small, granular scales irregularly disposed; claws very large, strong, curved downwards, pointed.

MEASUREMENTS OF AVERAGE SPECIMEN.

	Feet.	ins.	lines.
Total length	3	1	0
Length of tail	1	10	0
„ of head	0	2	6
„ of gape	0	1	11
„ from tip of muzzle to anterior edge of nostril ...	0	0	5½
„ from tip of muzzle to anterior edge of orbit	0	1	3½
„ from tip of muzzle to ear	0	2	5
Diameter of orbit	0	0	5
Width of forehead between eyes	0	1	0
Length from tip of snout to shoulder	0	6	6
„ of inner toe of anterior foot	0	0	5
„ of claw of ditto	0	0	6
„ of second toe	0	0	6
„ of claw of ditto	0	0	6
„ of third toe	0	0	9
„ of claw of ditto	0	0	6
„ of fourth toe	0	0	10
„ of claw of ditto	0	0	5
„ of fifth toe	0	0	6
„ of claw of ditto	0	0	5
„ from shoulder to base of third claw	0	3	9
Girth of body	0	11	0
Length from tip of snout to hind leg	1	2	6
„ of hind leg to base of third claw	0	4	8
„ of inner toe of hind foot	0	0	5
„ of claw of ditto	0	0	5
„ of second toe	0	0	7
„ of claw of ditto	0	0	6
„ of third toe	0	0	11
„ of claw of ditto	0	0	6
„ of fourth, or longest, toe	0	1	4
„ of claw of ditto	0	0	6
„ of outer or hind toe	0	0	6
„ of claw of ditto	0	0	5½
„ of largest teeth, about middle of jaw	0	0	1½
Height of scales of keels on back of tail	0	0	1
Granular scales in middle of back in longitudinal space of 6 lines	...	Nine	
„ „ „ transverse „	...	Eight	
Flat scales in middle of belly in longitudinal space of 6 lines	...	Six	
„ „ „ transverse „	...	Nine	

REFERENCE.—Gray, Cat., p. 12; = *Hydrosaurus Gouldi* (Gray), Ann. Nat. Hist., i., p. 394; and in Grey, Travels, v. 2, p. 422; and Er. and Ter. Rept., t. 3.

This is a smaller, much more beautiful, and rarer Lizard than the Lace Lizard, or so-called Iguana or Coast Lizard (figured on our Plate 41), and is only found in the north-west part of the colony, in the hot mallee-scrub country, where it is common, far away from water, running swiftly about the herbage, and sheltering in holes in the ground. When kept in confinement it does not

attempt to bite, but hisses loudly when much vexed; at other times giving a gentle snuffling sort of cough, such as babies emit before they are weaned. Like many other Lizards, the skin forms longitudinal wrinkles along the sides when quiet, but when irritated it inflates the skin of the body, swelling to a considerably larger size than before, and then the wrinkles disappear.

In habits this Lizard is much less arboreal, as Mr. Kershaw informs me, than the *Hydrosaurus varius*, or Lace Lizard, the latter always endeavouring to escape up a tree when alarmed, while the present species keeps on the ground and escapes into holes in the earth. The *Hydrosaurus* is a good swimmer, but this *Monitor* is most common in waterless districts. It is much less timid or inclined to escape, and is much less vicious in the use of its teeth than the Lace Lizard. M. Boulanger merges the sub-genera *Hydrosaurus* and *Monitor* in *Varanus*, but the difference in habit seems to give additional importance to the small structural differences, and I therefore prefer to retain them for the present.

The specimen figured is from Kewell, north of Murtoa, near Horsham, one of several obtained through the good offices of Mr. Jos. Hill, of that district.

EXPLANATION OF FIGURES.

PLATE 151.—Fig. 1, average specimen, half natural size. Fig. 1*a*, top view of head, natural size, showing the small, rounded vertex plate, small plates of crown of head, and still smaller ones over orbit. Fig. 1*b*, side view of head, natural size. Fig. 1*c*, under-side of anterior foot, natural size, to show granular palm, and prominent, transverse ridges of scales on toes. Fig. 1*d*, tongue, natural size, with sheath at base. Fig. 1*e*, scales of belly, magnified four diameters. Fig. 1*f*, scales of back, magnified four diameters. Fig. 1*g*, scales of tail, magnified four diameters. Fig 1*h*, teeth, magnified five diameters.

FREDERICK MCCOY.

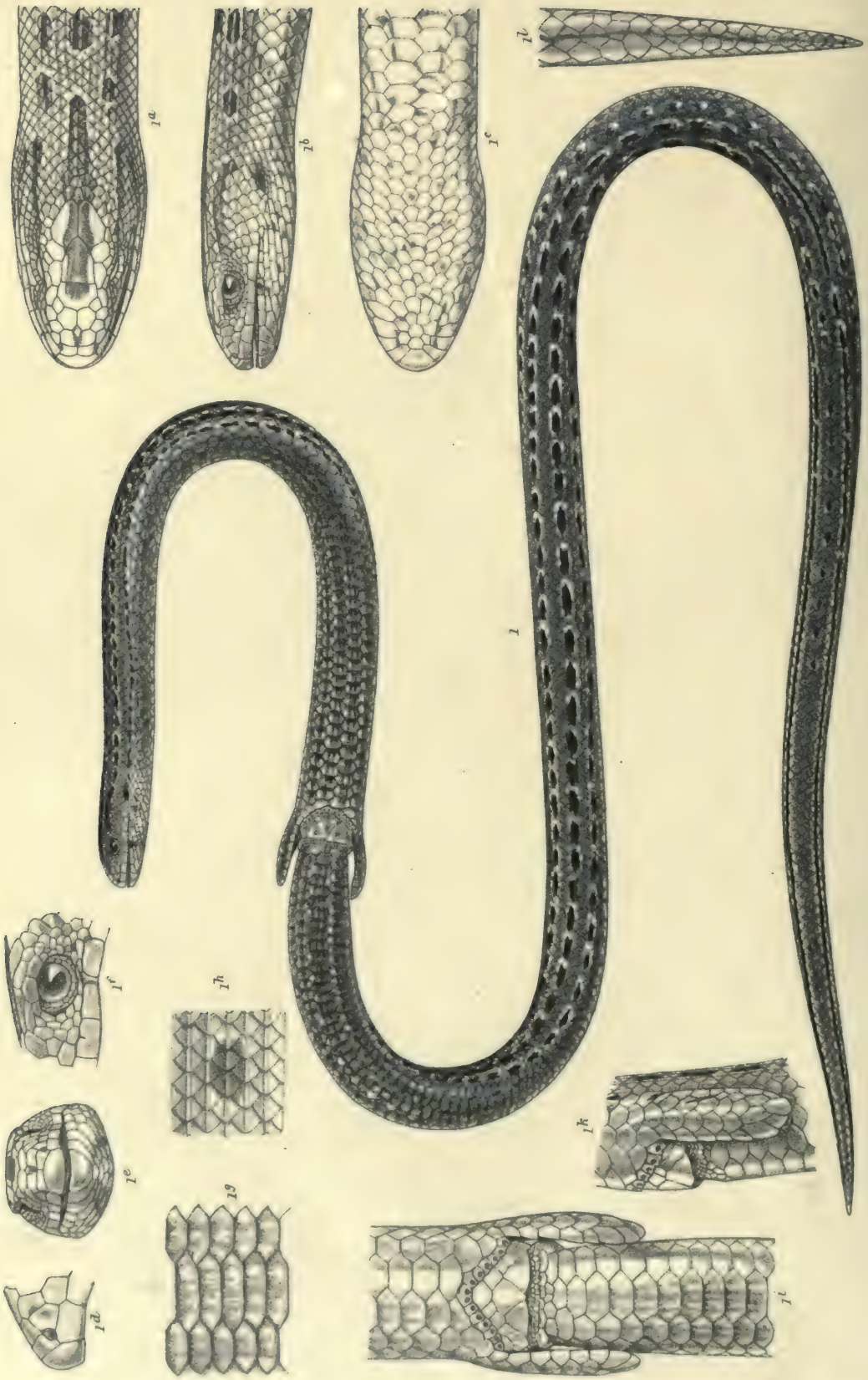

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PLATE 152, AND PLATE 153 FIG. 2.

PYGOPUS LEPIDOPUS (LACÉP. SP.).

THE PYGOPUS.

[Genus PYGOPUS (FITZINGER) = BIPES (CUV.) = HYSTEROPUS (DUM. AND BIB.). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Pygopidæ.)

Gen. Char.—Body snake-like, long, slender, cylindrical, tapering. Anterior legs none; posterior legs represented by a flat, elongate, ovate, scaly appendage on each side of base of tail, not divided into toes externally, but containing four rows of toe-bones. Pre-anal pores distinct, large, numerous. Head short, truncate, rounded. Plates: of head large; rostral plate large. Nostrils lateral, circular, in lower angle of transverse band-like nasal plate; two or more pairs of supra-nasal or fronto-nasal plates, like the nasals, over them; inter-nasal or pre-frontal plate large, with elongate frontal plate behind it; two large parietal plates and one small occipital plate behind the posterior ends of the parietal plates; two or three supra-ocular, or temporal, plates on each side. Ears: drums exposed, ovate, distinct, oblique. Pupil nearly circular, very broad, oval, erect. Eye-lids circular, rudimentary, scaly, immovable. Teeth conical, pleurodont, simple in jaws, none on palate, which has a wide longitudinal furrow. Tongue broad, flat, thin, scaly in front, velvety behind, rounded and notched at tip. Scales of back sub-hexagonal, keeled; ventral shields hexagonal, broad, two middle rows broadest; sub-caudal plates broad, in three rows, the middle one broadest. Scales of throat small. Parietal bones separate, premaxillary single, produced backwards between the nasals. Orbit separated from frontal by junction of pre- and post-orbitals. Australia.]

DESCRIPTION.—Head sub-trigonal, narrow and rounded in front; eye a little nearer tip of snout than ear; canthus rostralis obtuse; rostral plate large, about twice and a half as wide as long, varying from pentagonal, where the middle of the upper edge is raised in an angle between the nasals, to quadrangular where the upper edge is straight; two transversely oblong nasal plates and two pairs of nearly similar supra-nasal plates over them; nostrils round, in lower outer angle of nasals, surrounded by first labial, nasal, and freno-nasal; two or three rows of irregular polygonal plates on frenal region between nostril and eye; one (or two) small fronto-nasal plates on each side in front of temporal plate; temporal, or supra-ocular, plates three, the anterior largest, and posterior smallest; inter-nasal or anterior frontal large, heptagonal, a little wider than long, and wider than the frontal, with which its posterior edge forms a transverse suture, length about equal to the two supra-nasals; frontal sub-pentagonal, widest in front, sides indented by the temporal plates, about two-thirds the width of anterior frontal, and about one-third longer than wide; parietal plates forming nearly an equilateral triangle, notched in front for posterior end of frontal, and behind for a very small occipital. (Sometimes a narrow, posterior pair of parietal-like plates, as in Plate 153, Fig. 2*b*.) Chin-plate large, as wide as the rostral; seven sub-equal, oblong upper labial plates (separated from orbit by a row of small plates), the first (Plate 153, Fig. 2*a*), or first and second (Plate 152, Fig. 1*b*), extending downwards on side of chin. Eye-lids with two rows of very small scales. Pre-anal pores sub-tubular, usually six (five to seven) on each side of a triangle in front of five to ten large, irregular unequal, pre-anal, plates. Scales of back flat, sub-hexagonal, each with a very narrow, sharply defined, thread-

like keel, about one-seventh the width of the scale, in twelve rows at middle of body, keeled, and eleven rows without keels on sides and belly; keels of body continuous, of tail alternate; number of abdominal plates from throat to vent usually about 78 or 80. Posterior leg-lobes broad, rounded at tip, with four rows of scales on outer side, the length about four-fifths the length of head in males, or equal to nearly five of the scales of the sides in front; twice as long as wide; only as long as from tip of snout to anterior edge of eye in females. *Colors:* Very variable; ground color whitish below, lavender-blue above, with a brown tinge often on the outer skin; some specimens (as our Plate 153, Fig. 2) have only a few, irregular, dark specks or none on the sides and upper surface, and the under-side plain-yellowish-white; while others (as our Plate 152, Fig. 1) have a long, divided, black, white-edged patch on the top of the head, continued along midline of back as a series of oblong, black spots with narrow white edges, and one or two lines of similar, oblong, quadrangular, black, white-edged spots on each side, and the whole under surface netted or marbled with the lavender-blue of the back. I have one specimen with the former coloring on the anterior half of the body and the rows of white-edged black spots on the hinder half, and there are many subordinate variations of each, showing clearly that the specimens, apparently so different in this respect, do not differ in any other. A black vertical spot from the eye across both lips is the most constant. *Measurements:* From tip of snout to base of tail, 6 ins. 6 lines; from base of tail to tip of tail, 1 ft. 4 ins. 6 lines; length of head from tip of snout to ear, 8 lines; length of leg-flap, 5½ lines, width, 2 lines.

REFERENCE.=*Bipes lepidopodus*, Lacép. Annal. du Musé. d'Hist. Nat., v. 4, t. 45, f. 1; = *Pygopus lepidopus*, Merrem. Tent., p. 77; = *Hysteropus Novæ Hollandiæ*, Dum. et Bib. Erpt. Gen., v. 5, p. 828, t. 55 + *Pygopus squamiceps*, Gray Cat. Liz., p. 68, Er. and Ter. t. 8, Fig. 3.

These curious creatures are more like snakes than lizards in appearance, from the form of the body, absence of true feet, and having scales above, and larger abdominal and sub-caudal shields below. The resemblance to snakes rather than to lizards is anatomically suggested by the simplicity of the lower jaw bones on each side; the angular, supra-angular, and articular bones being anchylosed. The transverse row of pre-anal pores is like that in the *Amphisbenæ*. The two sides of the lower jaw being fixed in front, the external ears, eye-lids, and other structural characters show that they have no affinity with snakes, but are true lizards.

The spotted specimens often agree in coloring and marking with Dr. Gray's illustration of *Lialis Burtoni*, and the plainer ones agree with his *P. squamiceps* and Duméril's figure in coloring; but there are many intermediate specimens, clearly proving the character to be of no specific value; in some specimens, several of the oblong spots are confluent, forming short streaks.

The scales and plates of the head are so variable that I have no doubt Dr. Günther is right in uniting Dr. Gray's *P. squamiceps* to *P. lepidopus*. I have several specimens with one small plate between the inner ends of the posterior supra-nasals, as in our Plate 152, Fig. 1*a*, and some in which there are two, one between the anterior supra-nasals and one between the posterior supra-nasals; and one specimen with three in a median row, from one being between the nasals also; and in another the supra-nasal plates are each doubled; while the greater number of specimens have no intercalated plates in midline, and only the normal number of plates, as in our figure, Plate 153, Fig. 2*b*. In one specimen there are two, small inter-parietal plates between the anterior ends of the parietals; in another of the var. *squamiceps* there are two fronto-nasals on each side, as well as three pairs of supra-nasals and four intercalary plates in midline between the inner ends of them and the nasals.

The original figure of Lacépède in the Annals du Muséum shows the leg-flaps nearly in the middle of the length, and Gray's *P. squamiceps* has the tail only half the length of the anterior part, while in Duméril and Bibron's figure the tail is twice and a half as long as the part before the flaps, as in our figure, Plate 152, Fig. 1. This latter is the correct proportion of the perfect animal, but, like the English Slow-worm, it is so fragile during life that it easily loses a portion of the hinder part of the body; which lost part is reproduced quickly, but in such a way that the cautious observer can easily see when he is dealing with an individual specimen to which such a common accident has happened, by noting some slight difference in color and the texture of the scales, accompanied by a greater or less diminution of size from the true proportion. This may be clearly seen in Lacépède's figure (although he does not seem to have noticed it), in which the engraver has suddenly stopped the lines representing the keels of the scales at a point where, no doubt, the fracture took place, and beyond which the tail is a re-grown one of less than the original length. Similarly, the lithographer in Gray's figure of the very short-tailed *P. squamiceps*, clearly shows, by the difference of treatment, where the new growth has reproduced the tail so much too

short—again not noticed by the author. Our figure of the plain-colored variety on Plate 153, Fig. 2, also shows a slight difference of color and characters of the scales where a fracture during life and reproduction gives apparently yet another proportional length of tail.

Common, particularly in the warmer northern part of the colony.

EXPLANATION OF FIGURES.

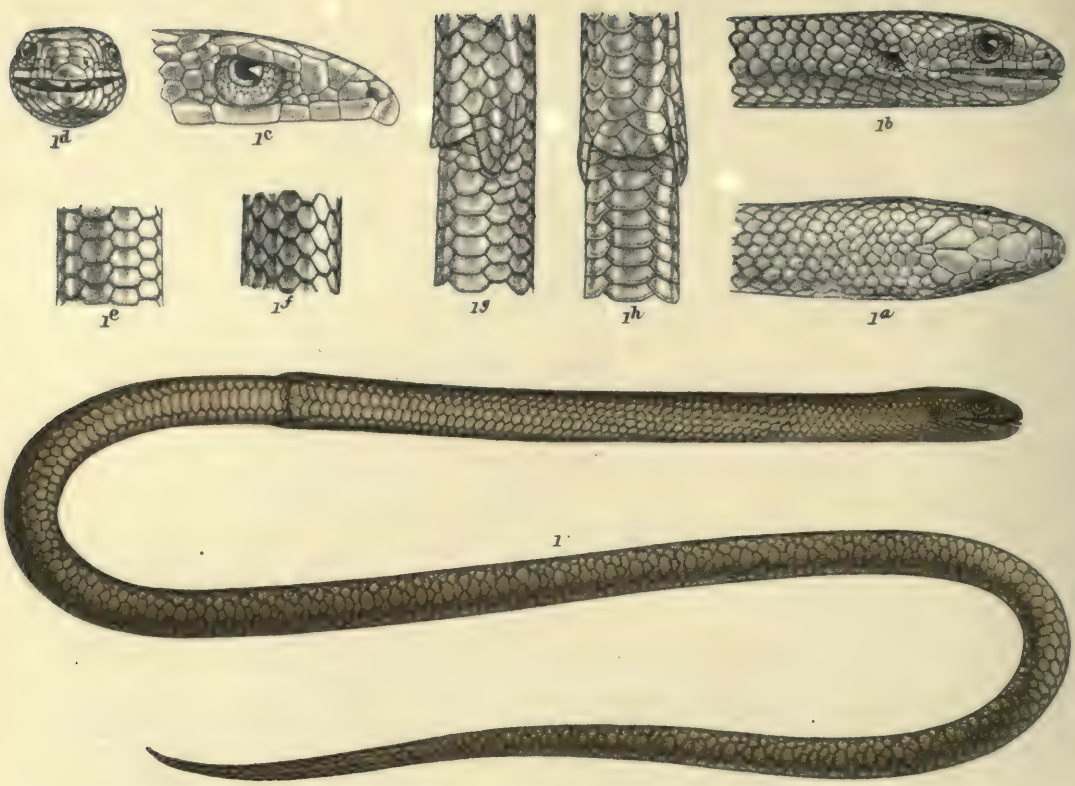
PLATE 152.—Fig. 1, fine, perfect, male average specimen, natural size. Fig. 1*a*, top of head, magnified two diameters, to show the form and proportion of cephalic plates (with one abnormal median plate between the inner ends of the posterior supra-nasals). Fig. 1*b*, side view of head, magnified two diameters, showing the side plates of head, the ear, and the keeled scales of the upper surface, and smooth scales of lower side. Fig. 1*c*, under-side of head, magnified two diameters. Fig. 1*d*, side view of snout, magnified four diameters, to show more clearly the relative position of nostril and surrounding plates. Fig. 1*e*, front view of head, magnified two diameters, showing the rostral and mental plates. Fig. 1*f*, scaly eye-lid and plates about orbit, magnified four diameters. Fig. 1*g*, Sub-caudal scales of middle and adjacent rows, magnified three diameters. Fig. 1*h*, scales of back, to show the narrow, definite, thread-like keel, magnified three diameters. Fig. 1*i*, under-side of end of abdomen and base of tail, magnified two diameters, to show pre-anal pores and adjacent scales. Fig. 1*k*, side view of same part, magnified two diameters, to show scaling of posterior feet. Fig. 1*l*, under-side of extremity of tail, magnified two diameters.

PLATE 153.—Fig. 2, female, variety, with plain coloring, natural size (the shortness of the tail being due to its having been reproduced after fracture). Fig. 2*a*, side view of head, magnified two diameters. Fig. 2*b*, top of head, showing some irregular variations in size and shape of plates, magnified two diameters. Fig. 2*c*, front view of head, magnified two diameters. Fig. 2*d*, side of snout, magnified four diameters. Fig. 2*e*, scaly eye-lid and adjacent plates, magnified four diameters. Fig. 2*f*, pre-anal pores, with shorter foot-flaps and adjacent scales, magnified two diameters. Fig. 2*g*, sub-caudal scales, magnified three diameters. Fig. 2*h*, dorsal scales, with narrow, definite, thread-like keel, magnified three diameters.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Reptiles)



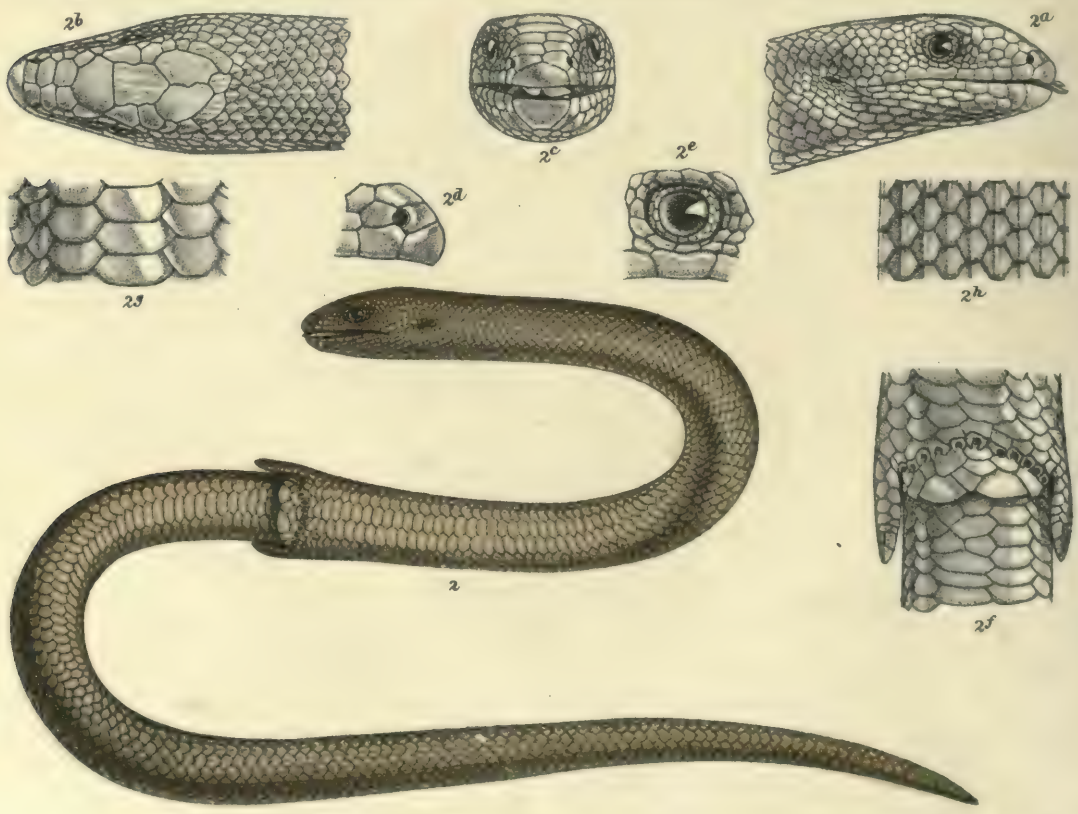


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PLATE 153, FIG. 1.

DELMA FRAZERI (GRAY).

FRAZER'S DELMA.

[Genus DELMA (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Pygopidæ.)

Gen. Char.—Body long, slender, tapering, snake-like; anterior limbs none; posterior limbs formed of small, flat, scaly, undivided flaps, one on each side of base of tail; pre-anal pores none; head small, ovate, with large symmetrical plates; rostral plate large; nostril in hind outer corner of transversely oblong nasal plate on each side; two pairs of transversely oblong supra-nasal, or fronto-nasal, plates, like the nasals; inter-nasal, or pre-frontal, plate large, heptagonal; frontal moderate, heptagonal, pointed behind; a pair of large parietal plates behind the frontal, and a small occipital between their posterior ends. Ears ovate, open, distinct, with simple edges. Scales hexagonal, smooth, unkeeled, small above; two rows, wider, along belly, one row of wider ones under middle of tail; eyes round, with circular, scaly, imperfect, immovable eye-lids; pupil nearly circular, broad-oval, erect. Parietal bones separate. Australia.]

DESCRIPTION.—Body and tail sub-cylindrical, very slightly flattened below, gradually tapering to a slender posterior point. Head semi-oval or sub-trigonal, sides nearly straight, converging to a bluntly-rounded, narrow muzzle, the tip of which measures to front edge of eye about as much as from posterior edge of eye to anterior edge of ear; rostral plate large, pentagonal, twice as wide as high; nasals small, transverse, quadrate, oblong, their inner ends touch, the outer end pierced by the large nostril, which is surrounded also by the first upper labial and the freno-nasal plate; naso-rostral plates transversely quadrate, inner ends touching, smaller than the nasals; fronto-nasals large, pentagonal, touching along inner edge, having freno-nasal and naso-rostral along longest front edge; inner posterior edge touching front edge on each side of inter-nasal; posterior outer edge touching a large ant-ocular or loreal plate in front of the two temporal plates; smallest outer edge touching the first of the three small frenal plates extending over the labials from the freno-nasal to a group of three or four small plates in front of the eye; inter-nasal or pre-frontal plate large, heptagonal, about as broad as long; frontal heptagonal, a little narrower and shorter than the pre-frontal, about one-third longer than wide, hind angle between parietals; two parietal plates, small, sub-pentagonal, inner edges in contact; straight, pointed posterior ends with a very small occipital plate between them; a large plate-like scale usually on each side of posterior lateral edge of parietal; upper labials five, fourth, under the eye, longest; lower labials four, first meeting under the chin behind the large trigonal mental plate; second very large, nearly meeting under throat, others small. Ear large, longitudinally-oval, slightly oblique, open, simple edged. Eye-lids covered with three rows of minute scales. Hind leg-flap small, as long as four scales of back at base, or equal to space from snout to orbit in males, shorter in females, covered with three rows of small scales, four in the middle row, placed at a distance from the ear of 65 rows of back scales. Scales of back small, sub-hexagonal, as broad as long, in fourteen to sixteen rows; belly, with two rows of from 50 to 60 pairs of larger hexagonal plates in middle, about twice as wide as long; three large pre-anal plates in a transverse row, middle one smallest; plates of under-side of tail in three rows of transversely hexagonal scales, middle row largest, nearly twice as wide as long near base, gradually becoming smaller, less transverse and irregularly arranged towards the

posterior end of tail. *Color:* Some specimens uniform light-greyish-brown, paler below; others have black, transverse patches on the snout, the middle of head coming down as a narrow, triangular mark through the eye on each cheek, and others have, in addition, a very variable number of fainter, triangular spots extending along the side where the back and belly scales meet, for a greater or less distance. *Measurements:* Tip of snout to base of leg-flaps, 3 in. 10 lines; tail, 12 in. 9 lines; tip of snout to ear, 5 lines; diameter at middle of body, 3½ lines; number of scales on middle of back in half-an-inch, 10.

Reference.—Gray, in Grey Trav. Austral., v. 2, p. 427, t. 4, f. 3; = *Delma Grayi*, Smith Ill. Zool. S. Africa Rept., t. 76, f. 2; ? = *D. Mölleri* Lütken Vidensk. Meddel 1862, p. 296, t. 1. f. 2.

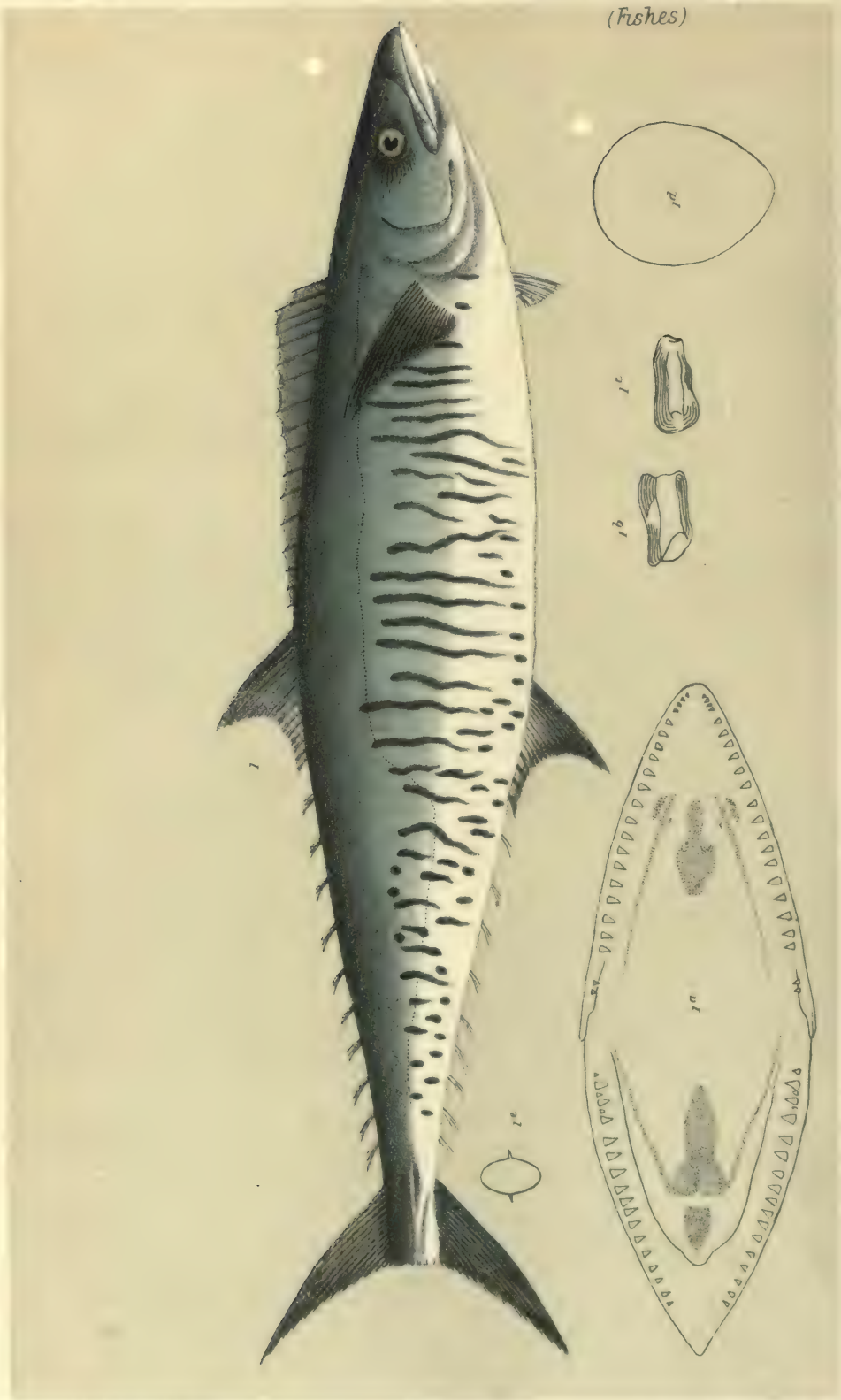
This genus mainly differs from *Pygopus* in the smooth, unkeeled scales of the body, and in the absence of the transverse row of pre-anal pores. The flaps representing the hind limbs are smaller than in that genus.

The original figure by Dr. Gray in Capt. Grey's Travels is much too short, the individual figured having obviously been broken during life, and the tail end re-grown of smaller dimensions than natural, as is very commonly seen; the apparently excessive length of Smith's figure being due to the specimen having escaped mutilation. I have no doubt that Dr Günther is quite correct in suggesting the specific identity of Gray's and Smith's species, the latter being really an Australian, and not an African, form. The greater number of the specimens found near Melbourne are of the plain uniform coloring of our figure, but I have a few with dark markings on the head and sides of neck depicted by Gray and Smith, differing in no other respect from the plain ones. One specimen in the Museum, from Newington station, in the Wimmera district, presented by Mr. Forster, of Stawell, has grown two tails, forking out from the place of previous fracture.

Explanation of Figures.

Plate 153.—Fig. 1, average specimen of plain colored variety, natural size. Fig. 1*a*, top of head, magnified two diameters, to show form of plates (large scale outside parietals divided on one side). Fig. 1*b*, side view of head and neck, showing ear, magnified two diameters. Fig. 1*c*, portion of side view of head, magnified four diameters, to show more clearly the scaly eye-lid, the large fourth labial, under the eye, the large loreal or ant-ocular plate, and other plates on the side of the head more clearly. Fig. 1*d*, front view of head, magnified two diameters, to show the rostral and mental plates, and the downward prolongation of the first and second lower labials. Fig. 1*e*, plates of under-side of belly, magnified two diameters, showing the two median rows wider than the two lateral ones. Fig. 1*f*, scales of back, magnified two diameters. Fig. 1*g*, side view of posterior end of body and anterior end of tail, to show leg-flaps, magnified two diameters. Fig. 1*h*, same part of body, magnified two diameters, viewed from below, showing the pre-anal plates with four rows of abdominal and three rows of sub-caudal plates, with their relative sizes, magnified two diameters.

Frederick McCoy.



A. Bartholomew del. et lith. Prof. McCoy dirext. Steam. litho. Govt. Printing Office

PLATE 154.

CYBIUM COMMERSONI (LACÉP. SP.).

COMMERSON'S MACKEREL.

[Genus CYBIUM (CUVIER). (Sub-kingdom Vertebrata. Class Pisces. Order Acanthopterygii. Family Scomberidæ.)

Gen. Char.—Body elongate, fusiform, moderately slender; cleft of the mouth wide First dorsal long, with rather feebly developed spines, reaching nearly to the second dorsal; seven or more finlets behind the dorsal; anal fin resembling the second dorsal in size, shape, and position, and with a similar number of finlets behind it; caudal fin moderate, forked, a strong prominent keel on each side the base of tail. Greater portion of body naked, or with very small scales, not forming distinct corselet. Teeth large, compressed, with cutting edges, lancet-shaped, on edge of both jaws, small villiform teeth on the vomer and palatine bones, similar patch on tongue. Seven branchiostegal rays. An air bladder. Indian and Atlantic Oceans.]

D. 16 + D. 1 + 16 + X.; P. 24; V. 1 + 5; A. 1 + 16 + IX.; C$\frac{1}{17}$; L.l. 265.

DESCRIPTION.—Height of the body at end of spinous dorsal 6$\frac{3}{4}$ times in total length, excluding caudal. Length of the head five times in total length, excluding caudal. Greatest depth of head rather more than three-fifths of its length. Diameter of eye rather more than one-seventh the length of the head, nearer to the snout than to hind edge of operculum. Profile of upper part of head nearly straight, sloping, surface slightly convex and smooth. Snout pointed in front, lower jaw less acute, but slightly longer, than the upper. Cleft of mouth extending to vertical of hind edge of eye. Twenty-seven sub-equal, slightly irregular, triangular teeth on each side in upper jaw, a little longer than wide. About 16, much larger and longer, in lower jaw. A few rows of scales above the pectoral, behind the head, and along the base of the first and second dorsals. Pectoral fin narrow, falcate, pointed, one-eighth the total length, excluding caudal. Ventral one-third the length of the pectoral, of one spinous and five branched rays. First dorsal commencing over base of pectoral, and extending to within a short space of the second dorsal. Second dorsal twice as high as the first, falcate, little longer than high. Anal nearly equal in size and shape to the second dorsal, its front edge a little in front of vertical from middle of second dorsal. Ten finlets behind second dorsal, and nine similar ones behind anal. Lobes of the caudal nearly equal, long and narrow. Lateral line from head slightly undulated to vertical from hind end of second dorsal, suddenly descending from thence and resuming the longitudinal direction from vertical of second finlet nearly in the middle of the body to the large prominent median keel at base of tail; two small curved ridges, one above and one below median keel. *Color:* Upper part of back purplish-blue, fading into silvery-white on lower part of sides and belly. The sides and belly marked with numerous irregular, nearly vertical, stripes and spots of a dark brownish-purple. Anterior dorsal purplish. Ventrals whitish. Pectoral, second dorsal, anal, and caudal fins bluish-black with a brown tinge. Base of pectoral whitish. Iris golden-bronze.

MEASUREMENTS.

	Ft.	ins.	lines.
Total length, excluding caudal	3	4	3
Length from tip of snout to posterior edge of operculum ...	0	8	0
Greatest depth at vent	0	7	2
Height of first dorsal	0	1	9
Length from tip of snout to origin of first dorsal	0	8	6
Length of first dorsal	0	10	2
Height of second dorsal	0	3	7
Length of first ray of ventrals	0	1	10
„ of lobes of caudal	0	5	9
„ of base of same	0	2	0

REFERENCE.—*Scomber Commersoni Lacépède*, Shaw Zool. Fish, v. 4, t. 85 = *Cybium*, id., Cuv. and Val. Poiss., v. 8, p. 165.

The specimen figured is the only example of this fine fish which has been observed on our coast; it was caught near Queenscliff in March, 1887. The example was quite fresh when our drawing was made, and the vertical stripes and spots were as distinct as shown, but Dr. Day in his "Fishes of Malabar" says they only appear after death. The body seems smooth and naked, the scales are so very minute (about ten in space of one line). I have counted the mucous pores as scales along the lateral line. The two or three rows of larger scales above the base of the pectoral fin behind the head are very conspicuous, but do not form a corselet. The villiform teeth forming patches on the vomer, palatines, and tongue are very minute.

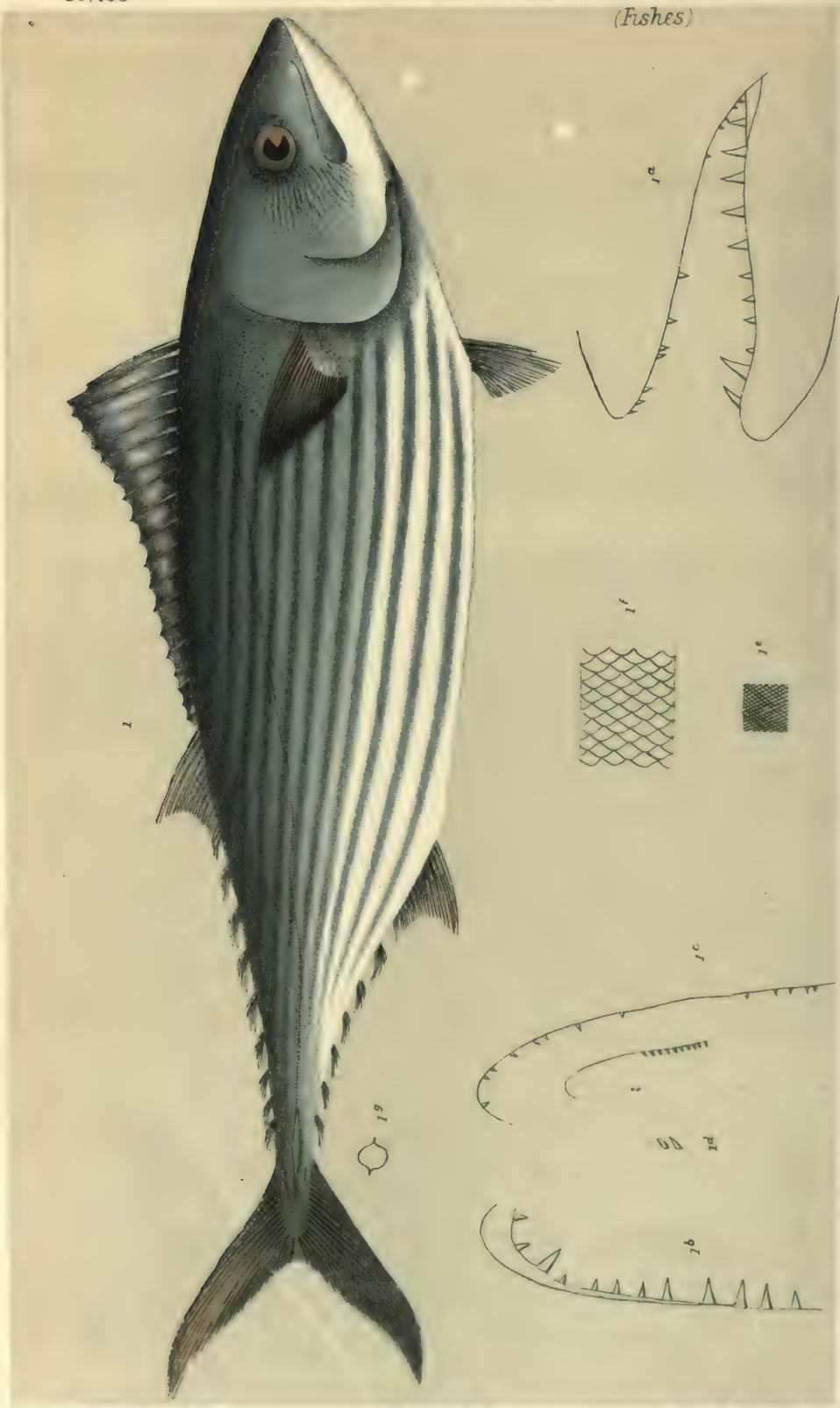
EXPLANATION OF FIGURES.

PLATE 154.—Fig. 1, side view, one-fifth natural size. Fig. 1*a*, mouth, one-half natural size, showing the large teeth on edge of jaws and patches of minute teeth on vomer and palatine bones above and on the tongue below. Figs. 1*b* and 1*c*, scales from lateral line, about the middle of length, magnified four diameters. Fig. 1*d*, form of section behind pectoral. Fig. 1*e*, sectional origin of caudal fin, to show lateral keels.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Fishes)



A. Bartholomew del. et lith.

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Steam Litho. Govt. Printing Office

PLATE 155.

PELAMYS SCHLEGELI (McCOY).

THE MELBOURNE PELAMYD.

Genus PELAMYS (CUV.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygia. Family Scomberidæ.)

Gen. Char.—Body elongate, ovate; cleft of mouth large; teeth large, compressed, irregular on jaws, smaller rows on palatine bones, none on vomer. First dorsal continuous, with moderately small spines reaching to the second dorsal, which is small; anal small, resembling the second dorsal; seven to nine dorsal finlets, and six or more anal finlets; caudal deeply forked; pectoral pointed; ventrals small. Thoracic scales forming a distinct corselet; a prominent longitudinal keel on each side of tail. Seven branchiostegal rays. No air bladder. Pyloric appendages branched.]

D. 19 + D. 2 + 12 + VIII; A. 2 + 11 + VI; V. 1 + 5; P. 25; C. $\frac{18}{22}$?

DESCRIPTION.—Greatest height of body about $4\frac{1}{2}$ in the length of body without caudal fin, or five times, including it. Length of head one-fourth of total length. Diameter of eye twice in length of muzzle, and three times to edge of operculum behind; slightly less than one-sixth the length of the head. The posterior end of maxillary does not quite reach the vertical of posterior edge of eye. Nine compressed, slightly inarched teeth on dentary bone, and two large ones on each side of front of lower jaw. The row of small palatine teeth, about fourteen on each side. Teeth of upper jaw much smaller than those of lower jaw. Pre-operculum with numerous thick, wavy longitudinal ridges; corselet not exceeding the tip of the pectoral in length. Lateral line with an upward, angular flexure under the sixth ray of dorsal, thence with slight undulations, largest under anal, to keel at middle of side of tail. Pectoral triangular, moderately pointed, rather less than one-eighth the length of the body, reaching as far as eighth spine of dorsal. Ventrals small, with a pointed scale at inner base of each. First dorsal commencing over anterior base of pectoral, second and third rays longest, gradually decreasing to anterior base of second dorsal. The last ray of the dorsal as counted above resembles one of the succeeding pinnules. *Color:* Back purplish-lavender-grey, becoming paler and silvery on sides of head; body, and belly, with about eleven longitudinal dark streaks running nearly lengthwise; five under second dorsal and dorsal finlets, turning upwards obliquely to dorsal edge. Fins with blackish membranes and lighter rays; the edges of the second dorsal, anal, and tips of the caudal lobes slightly yellowish. Iris pale-yellow. *Measurements:* Total length from tip of snout to end of body, excluding caudal fin, 1 ft. 8 in. Proportional measurements to length as 100: Depth of body, $\frac{22}{100}$; from tip of snout to end of operculum, $\frac{25}{100}$; to anterior edge of orbit, $\frac{8}{100}$; to posterior edge of orbit, $\frac{12}{100}$; to end of maxillary, $\frac{12\frac{1}{2}}{100}$; to base of first dorsal, $\frac{27}{100}$; to base of ventral, $\frac{31}{100}$; to base of pectoral, $\frac{26}{100}$; to end of corselet, $\frac{38}{100}$; to anal fin, $\frac{70}{100}$; to second dorsal, $\frac{58}{100}$; highest spine of first dorsal, $\frac{10}{100}$; length of pectoral, $\frac{12}{100}$; longest ventral ray, $\frac{7}{100}$; longest ray of second dorsal, $\frac{8}{100}$; longest ray of anal, $\frac{8}{100}$; longest ray of caudal lobes, $\frac{17}{100}$. Twelve scales in three lines under middle of first dorsal.

The Pelamyds differ from the Tunnies chiefly in their larger teeth. The beautiful species here figured does not agree exactly with any of those previously known. Its fin-rays are fewer than in *P. sarda*, and the color streaks are less oblique and more over the sides and belly, and the pectoral fin is larger. The *P. orientalis* of Japan, which approaches it in many respects, has, according to Schlegel's figure, a more flexuous lateral line and smaller pectoral (its length going about eight and a half in length of body, instead of considerably less than one-eighth, as in our example). The figure agrees with ours in having six anal pinnules, instead of eight, as described. (Dr. Günther gives nine, I suppose, by error, as he does not seem to have a specimen.) The longitudinal streaks in ours are more numerous, and extend more over belly, and do not conform so nearly to line of back. In all other respects, except one more ray in the first dorsal, the coincidence is so near that I think it may possibly be a variety ; but as the species of *Pelamys* and *Thynnus* are so nearly allied, I think it best to give a separate specific name. The *P. Australis* of Mr. Macleay, as described, differs in its longer snout as compared with diameter of eye, the greater backward extension of the maxillary, and fewer longitudinal streaks, as well as fewer anal fin rays.

The only specimen seen of this fish was caught in Port Phillip Bay on 19th of January, 1877.

EXPLANATION OF FIGURES.

PLATE 155.—Fig. 1, side view, about one-third natural size. Fig. 1*a*, side view of mouth, natural size, showing approximate number and size of teeth in upper and lower jaw. Fig. 1*b*, one side of lower jaw, viewed from above, natural size. Fig. 1c, one side of upper jaw, viewed from below, showing the small teeth on edge, the row on palatine bone, and two minute teeth, directed forwards, on vomer, natural size. Fig. 1*d*, the two vomerine teeth, magnified. Fig. 1*e*, scales from above lateral line near middle of fish, natural size Fig. 1*f*, ditto, magnified four diameters. Fig. 1*g*, section at base of tail, to show lateral ridges.

FREDERICK McCOY.

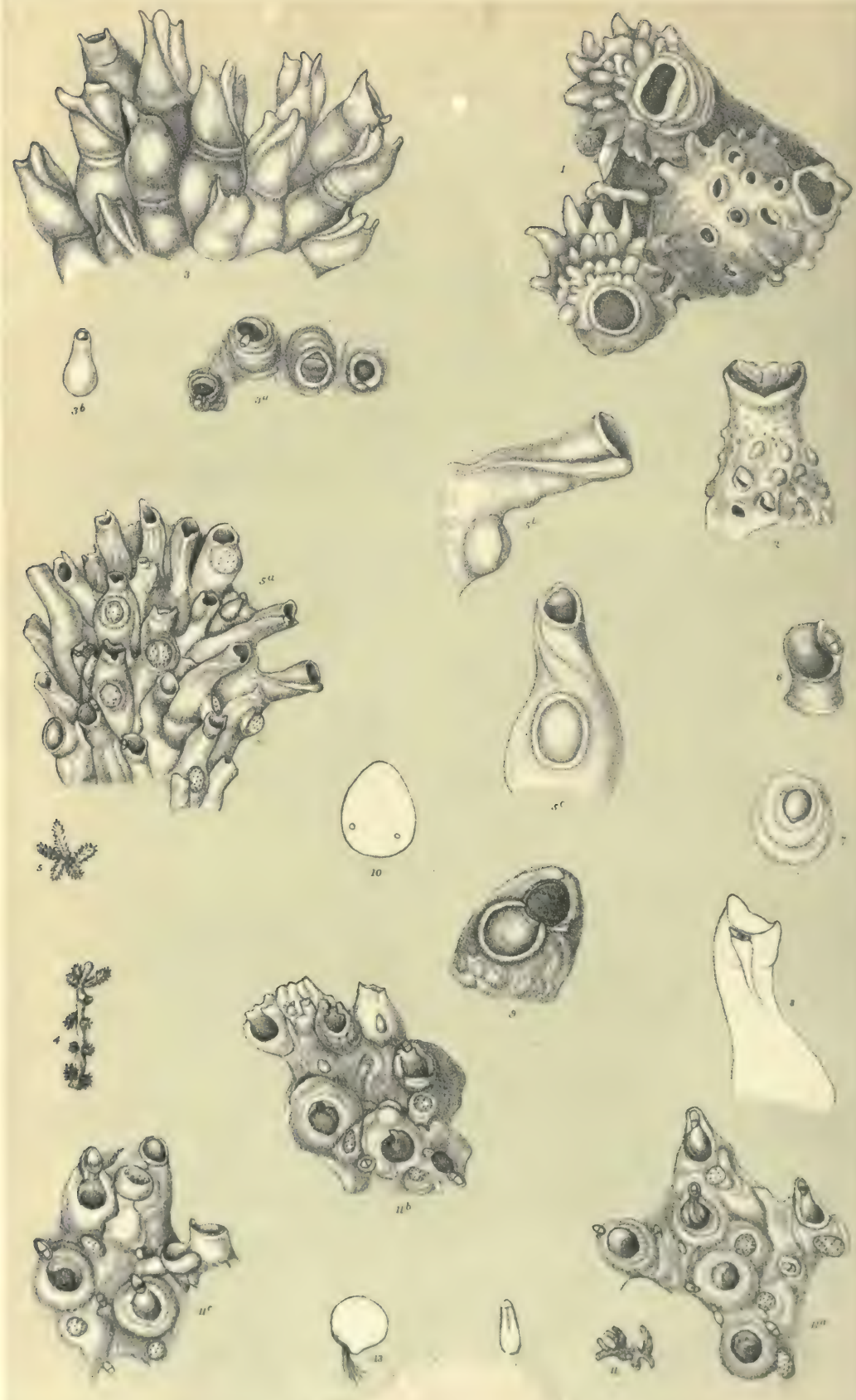
3
1
3b
3a
5b
2
5a
5c
6
10
7
5
9
4
8
11b
11c
11a
13
11

PLATE 156, FIGS. 1 AND 2.

LAGENIPORA TUBERCULATA (McG.).

[Genus LAGENIPORA (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Celleporidæ.)

Gen. Char.—Zoarium encrusting; zoœcia flask-shaped; mouth sub-circular, without a sinus.]

DESCRIPTION.—Zoœcia large, flask-shaped, erect or semi-erect, surface studded with large, hollow, pointed, entire, or perforated tubercles; mouth rounded or oval, with a thickened projecting peristome.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1882.

Port Phillip Heads.

In this species the zoœcia are very large and covered with numerous raised tubercles, which are entire and pointed, or not so prominent and perforated. These perforations do not seem to be, as I at first supposed, caused by attrition, as in some cases the margins are unequal, thick, and lip-like. The peristome is much produced, cylindrical, rough, with small granulations, and the circular or oval mouth has a thickened margin. I have not seen avicularia or oœcia.

EXPLANATION OF FIGURES.

PLATE 156.—Fig. 1, three zoœcia, showing pointed entire tubercles, and others open, less prominent, and almost pore-like. Fig. 2, a single zoœcium viewed laterally, to show the peristome.

PLATE 156, FIG. 3.

LAGENIPORA NITENS (McG.).

DESCRIPTION.—Zoœcia oblique or decumbent at the edge of the zoarium, more erect towards the centre, smooth; mouth in the marginal zoœcia with a tubular peristome, separated by a narrow, constricting collar; orifice with a spinous process on each side, between which is a small avicularium, carried in a semi-spiral tube, widened above and ending in a clavate projection; mouths of other zoœcia circular or sub-circular, with a small oval avicularium on one side; vicarious avicularia broadly spatulate.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

Of this interesting species I have only seen the minute specimen figured, and other examples are much to be desired for more complete examination. In the simplest zoœcia there is no peristome, and there is a small avicularium at one side of the mouth. The marginal zoœcia have a projecting cylindrical peristome, produced to a point at each side, and having between these a minute avicularium on a semi-spiral tube, as is found in *Lekythopora hystrix*. In the absence of other specimens, it is difficult to say whether the avicularium of the simple mouth is carried up on the peristome of the others or whether the marginal zoœcia with the constricted peristomes are not rather comparable to the young zoœcia of some of the smaller *Celleporæ*, and the simpler zoœcia in reality older. It undoubtedly belongs to the same genus as Mr. Hincks' Madeiran *Phylactella lucida*, afterwards referred to *Lagenipora*, and his *L. spinulosa* from Queen Charlotte Island.* It is, I think, probable that *L. tuberculata* and *L. nitens* will require to be referred to different genera.

EXPLANATION OF FIGURES.

PLATE 156.—Fig. 3, zoœcia, showing the tubular constricted peristomes, with the semi-spiral aviculiferous tubes. Fig. 3*a*, zoœcia without peristome, but with an avicularium at the side of the mouth. Fig. 3*b*, vicarious avicularium.

PLATE 156, FIGS. 4–10.

LEKYTHOPORA HYSTRIX (McG.).

[Genus LEKYTHOPORA (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Celleporidæ.)

Gen. Char.—Zoœcia flask-shaped or elongated, oblique or erect, crowded; primary mouth with a notch in the lower lip and a small avicularium at one side; secondary mouth with the peristome produced into a long, tubular orifice, on one side of the margin of which is the avicularium, connected with its original position by a minute semi-spiral tube; oœcia projecting from the front of the zoœcia below the mouth, covered by a chitinous or sub-calcareous plate.]

DESCRIPTION.—The same as that of the genus.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Oct. 1882.

* Ann. and Mag. Nat. History, Jan. 1884.

Port Phillip Heads.

This species is not uncommon at Port Phillip Heads, and is found growing on *Adeonella* and allied polyzoa. The zoarium attains a height of three-fourths of an inch, and is simple or more usually branched. The zoœcia are very much confused, flask-shaped, oblique or erect, the surface smooth, rough or pitted. It is extremely difficult to see the primary mouth, owing to the rapid development of the peristome. It is lofty, with a sinus in the lower lip. The peristome is produced into a long, nearly cylindrical tube, carrying a horizontal avicularium on one side, situated on the summit of a minute semi-spiral tube. The avicularium seems to be originally situated at the sides of the primary mouth immediately after the commencement of the development of the peristome, and, as the peristome grows, it is carried upwards in a semi-spiral manner. This oral avicularium is frequently absent. In some specimens there are numerous large, spatulate, vicarious avicularia. The oœcium is very peculiar, being situated below the mouth, and the front being deficient in calcareous matter and closed by a convex, lens-shaped, thick, chitinous membrane. This membrane is smooth or faintly perforated or, when older, occasionally sub-calcareous and cribriform.

EXPLANATION OF FIGURES.

PLATE 156.—Fig. 4, branch of an *Adeonella* with several zoaria of *Lekythopora* growing on it, natural size. Fig. 5, another zoarium, natural size. Fig. 5*a*, portion of the same, magnified, showing zoœcia with peristomes and oœcia. Fig. 5*b*, lateral view of single zoœcium from the same, showing the peristome, semi-spiral aviculiferous tube, and profile of oœcium. Fig. 5*c*, another zoœcium, to show the shape of the membranous front of the oœcium. Fig. 6, orifice of peristome from another specimen, with the oral avicularium. Fig. 7, primary mouth, seen vertically. Fig. 8, outline of a peristome, with avicularium and top of tube. Fig. 9, to show the commencement of formation of an oœcium. Fig. 10, an operculum.

PLATE 156, FIGS. 11-13.

PŒCILOPORA ANOMOLA (McG.).

[Genus PŒCILOPORA (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Celleporidæ.)

Gen. Char.—Zoarium erect, bilaminate, branched. Zoœcia indistinct; primary month with a sinus in lower lip; peristome commencing as an elevated point with a small avicularium on the summit, finally becoming a tumid, sub-circular ring. Oœcia immersed, covered by a perforated plate.]

DESCRIPTION.—That of the genus.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

Of this very curious species I have only one good specimen, for which I am indebted to Mr. Wilson, and two or three imperfect fragments. The zoarium is small, branched, bilaminate. The youngest zoœcia, and those at the margins of the branches, have one side produced into a long point, with a small avicularium on the inner surface at the summit. As growth advances, the summit disappears, and the mouth becomes surrounded by a tumid peristome, with the avicularium usually on the outer part of the ring. The pointed process, with its surmounting avicularium, seems to be formed before the operculum, as in the zoœcia showing these parts it cannot be detected. In a few older zoœcia, where the peristome is developed into a thick, circular ring, the internal mouth can be seen with a sinus on its *superior* lip, that is, towards the *upper end* of the branches. On the basal side of the mouth is a perforated plate, covering the oœcium. In young zoœcia the oœcium appears first as a cupped elevation, which becomes covered by a perforated plate, and gradually sinks into the substance of the zoœcium. The most curious circumstance is that, although the oœcium appears to be below the mouth, it is really above it, owing to the peculiar reversal of the mouth.

Pœcilopora is allied to *Lekythopora*, but differs in the absence of the long, tubular peristome, and in the mature oœcia being immersed.

EXPLANATION OF FIGURES.

PLATE 156.—Fig. 11, specimen, natural size. Fig. 11*a*, portion from the growing edge, magnified. Fig. 11*b*, portion from the extremity of a branch, magnified, one of the zoœcia showing the internal or primary mouth. Fig. 11*c*, another portion, showing the growth of the oœcium.

I am indebted to Mr. MacGillivray for the specimens and descriptions of the above Polyzoa.

FREDERICK McCOY.

PLATE 157, FIG. 1.

FASCICULIPORA GRACILIS (McG.).

[Genus FASCICULIPORA (D'ORBIGNY). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cyclostomata. Family Frondiporidæ.)

Gen. Char.—Zoarium erect, simple or branched or lobate. Zoœcia opening only at the extremities of the branches or also (in *F. bellis*) in one or more regular series below the extremity.]

DESCRIPTION.—Zoarium small. Zoœcia in somewhat flattened bundles, very long, slender, usually distinct and free at the extremity, surface thickly punctate, except the part immediately below the mouth, which is smooth or transversely wrinkled.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1882.

Port Phillip Heads.

A small species, consisting of simple or divided bundles of long, slender zoœcia of a glassy appearance. The extremities usually project and are free, and the mouth is circular. The zoœcia at the surface of the bundles are separated by distinct grooves, and are thickly marked, except immediately below the mouth, with small, raised, white puncta. The oœcia in this, as in the other species of the genus, are unknown.

EXPLANATION OF FIGURES.

PLATE 157.—Fig. 1, specimen, natural size. Fig. 1*a*, the same, magnified.

PLATE 157, FIG. 2.

FASCICULIPORA BELLIS (McG.).

DESCRIPTION.—Zoœcia in small, erect bundles, mostly opening at the summit by prismatic orifices; one or two series opening lower down, the upper of these frequently separated, and their orifices reaching to the same level as those of the chief mass of the bundles; surface minutely punctate.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1883.

Port Phillip Heads.

A small and very beautiful species, of which I have only seen one specimen. In this there are six or seven bundles of zoœcia spread over a small calcareous nodule and connected by a calcareous punctate or perforated crust. When viewed vertically, they suggest a resemblance to a composite flower on the end of its pedicle.

EXPLANATION OF FIGURES.

PLATE 157.—Fig. 2, specimen, natural size. Fig. 2*a*, bundle, viewed sideways, magnified. Fig. 2*b*, upper extremity of same, seen vertically.

PLATE 157, FIG. 3.

FASCICULIPORA FRUTICOSA (McG.).

DESCRIPTION.—Zoarium branched, the main branches mostly horizontal, with numerous short branches turned upwards, the scondary branches consisting of bundles of zoœcia, all opening by closely packed prismatic orifices; surface punctate, faintly sulcate longitudinally and (especially in older parts and on the back) transversely corrugated.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Dec. 1883.

Port Phillip Heads.

Distinguished from *F. ramosa* by the much smaller number of zoœcia in the narrower branches. Some of my specimens form dense, shrub-like tufts an inch in diameter.

EXPLANATION OF FIGURES.

PLATE 157.—Fig. 3, specimen, natural size. Fig. 3*a*, portion of the same, magnified.

PLATE 157, FIG. 4.

FASCICULIPORA RAMOSA (D'ORBIGNY).

DESCRIPTION.—Of this I have only seen the portion figured, which is perhaps not sufficient for certain identification. It consists of a short, thick, obscurely bilobed, densely packed bundle of zoœcia, all opening on the summit. The zoœcia are not separated on the surface, which is closely transversely rugose and thickly punctate. The zoœcia open on the surface by prismatic orifices, none of which are produced.

REFERENCE.—Busk, Cat. Pol. Brit. Mus., pt. iii., p. 37, pl. xxxiii., fig. 2.

Portland; Mr. Maplestone.

EXPLANATION OF FIGURES.

PLATE 157.—Fig. 4, specimen, natural size. Fig. 4*a*, the same, magnified.

Mr. MacGillivray has contributed the specimens and descriptions of the *Fasciculiporæ* on this plate.

FREDERICK McCOY.

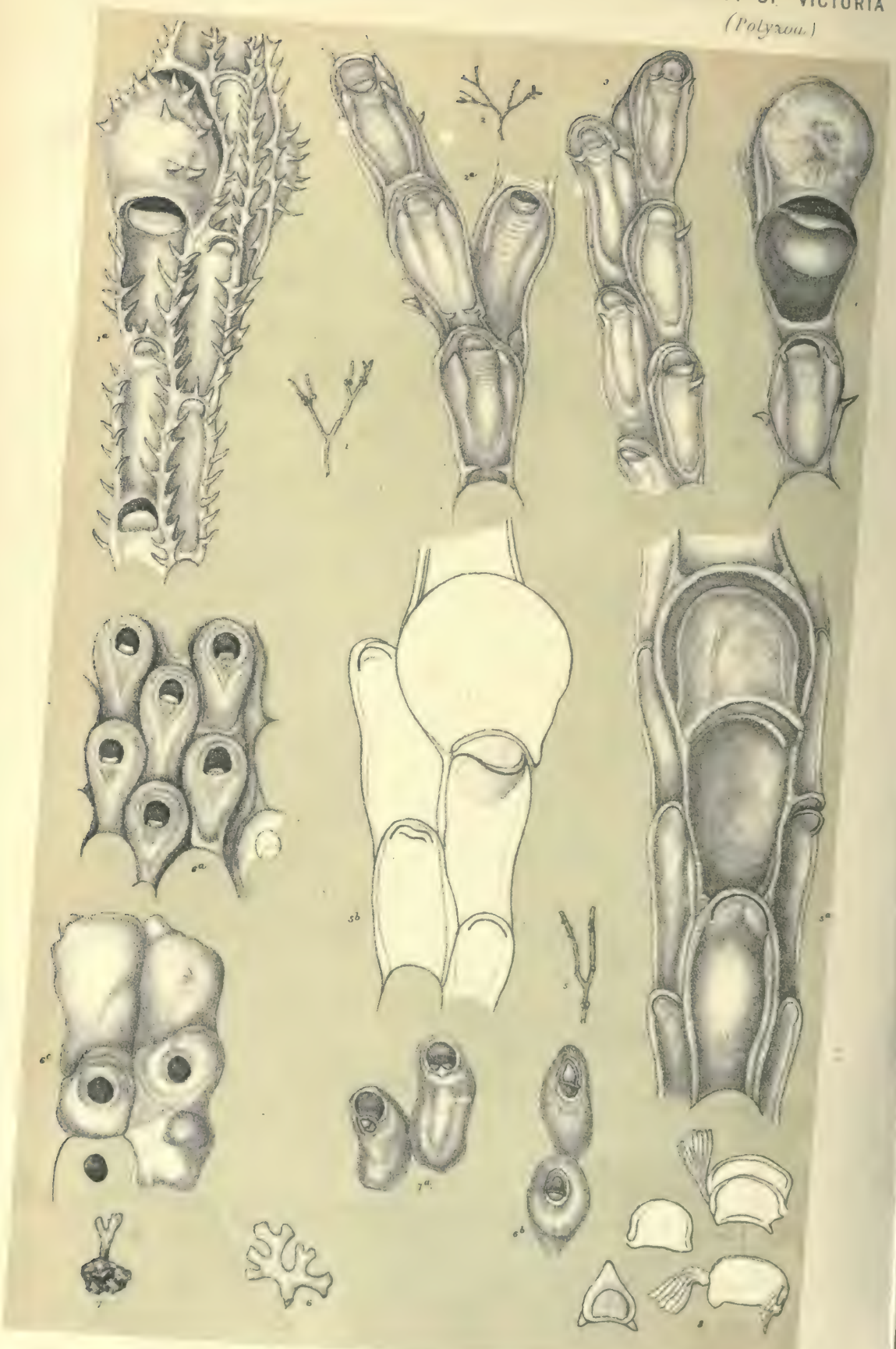

PLATE 158, FIG. 1.

FARCIMINARIA ACULEATA (BUSK).

[Genus FARCIMINARIA (BUSK). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Farciminariidæ.)

Gen. Char.—Zoœcia oblong, elongated, closely contiguous, depressed in front, with raised margins; mouth close to the summit. Avicularia, when present, sessile or sub-immersed at the bottom or on the front of the zoœcia. Oœcia prominent, superior.]

DESCRIPTION.—Zoœcia very much elongated, narrow, separated by distinct, raised margins; a close series of single or furcate aculeate spines, directed upwards and inwards, along the margin. Oœcia large, galeate, with several large, aculeate spines. No avicularia.

REFERENCE.—Busk, Cat. Mar. Pol. Brit. Mus., pt. i., p. 33, pl. lxiv., figs. 4, 5; pl. lxv. (bis), fig. 6.

Port Phillip Heads.

Distinguished from the other species by the long, narrow, zoœcia, the marginal aculeate spines, and the aculeate spines on the oœcium.

EXPLANATION OF FIGURES.

PLATE 158.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of same, magnified.

PLATE 158, FIGS. 2–4.

FARCIMINARIA UNCINATA (HINCKS).

DESCRIPTION.—Zoœcia elongated, wide and rounded above, contracting inferiorly, separated by slightly raised margins; frequently a small, incurved, uncinate spine towards the base; an uncinate process from the front of the zoœcium on each side, below or opposite the mouth. Oœcia large, unarmed.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., Oct. 1884.

Port Phillip Heads.

In this species the zoœcia are much wider above, contracting below. There is frequently, but not always, an incurved spine on each side towards the lower part. The front of the zoœcium is obscurely divided into three parts: the central, the same width as the mouth, is faintly lined transversely at its upper part; the two lateral, immediately below or opposite the mouth, give origin to a process terminating in a chitinous spine.

I have examined only a few dried specimens, and from these it is impossible to say whether there is any real division of the body-cavity. Mr. Hincks describes and figures the oral uncinate spines as arising from sack-like structures, but the appearance is probably owing to his having examined old, dried and shrivelled specimens. The minute disks on the front of the zoœcia mentioned by him also only occur in old specimens, and are similar to the markings seen under similar circumstances in many other polyzoa.

EXPLANATION OF FIGURES.

PLATE 158.—Fig. 2, specimen natural size. Fig. 2*a*, portion of same, magnified. Fig. 3, portion of branch of another specimen. Fig. 4, two zoœcia, the upper surmounted by an oœcium.

PLATE 158, FIG. 5.

FARCIMINARIA SIMPLEX (McG.).

DESCRIPTION.—Zoœcia much elongated, narrow, but wider above, separated by raised, slightly crenulated, or smooth margins; no spines nor avicularia. Oœcia very large.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1885.

Port Phillip Heads.

This species differs from the others in the absence of avicularia and of spines or processes of any sort on the separating margins of the zoœcia. The oœcium is of great size. It is smooth,

globular, but when dried becomes wrinkled and has a depression round the upper edge and sides, owing to the shrivelling of the delicate outer envelope, which seems to be separated by some distance from the inner part.

In the *Challenger* Polyzoa, Mr. Busk describes eight species of *Farciminaria*, and says that "the genus may be regarded emphatically as abyssal; the mean depth at which the species here enumerated occurred being not less than 1,500 to 1,600 fathoms, or from 450 to 2,750 fathoms." *F. Brasiliensis* was, however, found at from 32 to 400 fathoms. The three species here recorded were dredged from a depth of 10 to 15 fathoms, so that the genus cannot by any means be considered as abyssal, a fact which Mr. Busk would no doubt have ascertained if the dredgings of the *Challenger* had not been almost exclusively confined to deeper waters.

EXPLANATION OF FIGURES.

PLATE 158.—Fig. 5, branch of specimen, natural size. Fig. 5*a*, portion of same, magnified, showing a shrunken oœcium. Fig. 5*a*, another portion, in outline.

PLATE 158, FIGS. 6–8.

BRACEBRIDGIA PYRIFORMIS (BUSK, SP.).

[Genus BRACEBRIDGIA (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ.)

Gen. Char.—Zoarium encrusting, or erect and bilaminate. Zoœcia distinct, entire; mouth sub-circular, with an internal denticle; peristome raised, thick, vicarious avicularia on the free margins of the branches, the triangular mandibles with a projecting articular process at each lower angle.]

DESCRIPTION.—Zoarium usually consisting of flat bilaminate branches with lateral lobes, the branches more or less twisted on themselves. Zoœcia pyriform, separated by deep grooves; mouth sub-circular, with a broad denticle internally, and occasionally a small apiculate process on the lower lip; an elevated ridge round the mouth, the two sides meeting below the lower lip and continuing down the zoœcium as a central elevation; surface smooth or minutely granular. On the free edge of the lobate branches is a single row of aviculiferous cells.

REFERENCE.—*Mucronella pyriformis*, Busk, *Challenger* Polyzoa, pt. i., p. 155, pl. xx., fig. 5; *Bracebridgia pyriformis*, MacGillivray, Tr. Roy. Soc. Vict., Nov. 1885.

This seemingly common species, which I have dedicated generically to my friend Mr. J. Bracebridge Wilson, was first described by Mr. Busk and doubtfully referred to *Mucronella*. It attains a height of one or two inches. In the younger parts of the zoarium the zoœcia are very distinct, but, as age advances, the divisions between them become much fainter, the zoœcia themselves are squarer, and the mouth appears as a circular opening surrounded by a tumid border. Many of the zoœcia are then also closed. On the free edges of the lobate branches, in most specimens, there is a single row of avicularian cells, the triangular mandibles of the avicularia having projecting articular processes at the lower angles. One very young specimen (Fig. 7) rises as a small bifid lobe from an encrusting base. Towards the edge of the encrusting part many of the zoœcia are closed or not properly formed, while, both external and internal to these, are some in which the mouths have clear, narrowly elevated margins, with an apiculate mucro below and, in a few, a broadly elliptical avicularium across the front of the lower lip.

EXPLANATION OF FIGURES.

PLATE 158.—Fig. 6, specimen, natural size. Fig. 6*a*, portion towards the periphery, showing normal zoœcia. Fig. 6*b*, two avicularian cells from the margin of a lobe. Fig. 6*c*, older zoœcia towards the base of the specimen, two completely closed. Fig. 7, young specimen, growing from an encrusting base, natural size. Fig. 7*a*, two zoœcia from encrusting part, showing apiculate process and oral avicularium. Fig. 8, opercula and mandible of avicularium from edge of a lobe.

Mr. MacGillivray has kindly contributed the specimens and descriptions of the above species of the genera *Farciminaria* and *Bracebridgia*.

FREDERICK MCCOY.

PLATE 159.

PALINURUS HÜGELI (HELLER).

SYDNEY CRAW-FISH, OR SPINY LOBSTER.

Genus PALINURUS (FAB.). (First section, with rostrum.) (Sub-kingdom Articulata. Class Crustacea. Order Decapoda. Section Macrura. Tribe Astacidea. Family Palinuridæ.)

Gen. Char.—Carapace sub-cylindrical, broadly rounded on sides, with a small rostrum. Antennary segment very narrow above. Antennæ without basal scales, nearly in contact at base, covering the inner antennæ; basal joints long, sub-cylindrical; flagella of inner antennæ very short; anterior legs monodactyle; sternum trigonal.

DESCRIPTION.—Carapace semi-fusiform, narrowed in front, convex above; upper surface and upper half of sides covered with large sub-cylindrical tubercles, directed forwards and upwards, and each terminated with a small sharp spine; a wide, smooth, transverse sulcus a little in advance of the hind margin, behind which the one or two rows of spines are smaller; rostrum strong, conical, sharp-pointed, slightly compressed, smooth, extending forwards more than half its length in advance of front; upper edge straight, horizontal, or very slightly inclined upwards; a small compressed spine in front of orbit on each side of base of rostrum; supra-ocular spines large, shorter than rostrum, smooth, compressed, sharp-pointed, diverging forwards, upwards and outwards; infra-ocular spine on lower front edge of carapace from hepatic region, rather smaller than the rostrum; the spinose tubercles cease at a line extending from the anterior lateral angle of the carapace to the posterior lateral angle, and below this level the sides of the carapace are smooth or with microscopic granules. Anterior legs slender, penultimate joint with one small spine, at one-third its length from base on inner side; third joint compressed to inner ridge, which has one strong spine near anterior edge, and one smaller a little in front of posterior edge; upper or dorsal ridge of all the legs ending in a short spine in front, and with a smaller one at outer front edge; legs otherwise nearly smooth. Abdominal segments nearly uniformly arched and convex, nearly smooth, with very fine, irregular granules and puncta, the posterior edge of sixth segment fringed with small spinous tubercles directed backwards, lateral spinose ends of all but first segment with seven or eight serratures gradually diminishing in size on hinder edge; telson oblong, rounded at end, with longitudinal rows of spinose tubercles, lateral lobes of tail with rows of very much smaller spines on outer basal half. *Color:* Upper surface of carapace and abdomen dark olive-brown; smooth sides of thorax and lateral spines of abdomen rich reddish-chestnut, with few small, scattered, cream-colored spots; a very conspicuous, cream-colored, narrow line extends from the anterior to the posterior lateral angle of carapace, a little below the level at which the spinous tuberculation of back ceases, and a similar one, at right angles to its anterior third, joins similarly colored lower edge; spines, terminating tubercles of back, and antennæ, black, with cream-color bases; antennæ and legs reddish-chestnut-brown, legs sparingly flecked with cream-color; five lobes of tail rich dull-brownish-orange in middle, with blackish borders. *Measurements:* Total length from tip of

snout to end of tail-flap, 1 ft. Proportional measurements to total length as 100: Length of thorax from tip of rostrum, $\frac{40}{100}$; length of abdomen to penultimate joint of abdomen, $\frac{40}{100}$; greatest width of thorax behind middle, $\frac{25}{100}$; width of anterior third, $\frac{21}{100}$; depth of thorax, $\frac{21}{100}$; greatest width of abdomen, $\frac{22}{100}$; length of telson, $\frac{19}{100}$; greatest width of telson at anterior end, $\frac{13}{100}$; greatest width of telson near posterior end, $\frac{10}{100}$; length of first three joints of outer antennæ, $\frac{20}{100}$; width of ditto, $\frac{8}{100}$; length of flagella of outer antennæ, $\frac{80}{100}$; length of rostrum, $\frac{5}{100}$; length of supra-orbital spines, $\frac{4}{100}$; length of first joint of inner antennæ, $\frac{11}{100}$; second joint, $\frac{5}{100}$; third joint, $\frac{7}{100}$; flagella, $\frac{45}{100}$; length of first pair of legs, $\frac{30}{100}$; second pair, $\frac{39}{100}$; third pair, $\frac{44}{100}$; fourth pair, $\frac{43}{100}$; fifth pair, $\frac{35}{100}$; greatest width of first leg (behind middle of penultimate joint), $\frac{4}{100}$.

REFERENCE.—Heller, Sitzungsbericht der Wiener Akad. der Wissenschaften, v. 45, p. 393, and Reise der Novara Crust., p. 96, t. viii.; ? = *P. tumidus* (Kirk), Tr. N.Z. S., v. xii., p. 314.

This species, which is the Common Sydney Craw-fish, is easily distinguished from the southern one, the *P. Lalandi*,* which is the Common Melbourne Craw-fish, by its nearly smooth abdomen, larger rostrum, smaller anterior legs, and different colors. It has not been figured of the colors of life before. It is so rare south of N. S. Wales that I have only seen one (now in the Museum and figured on our plate), and heard of another, caught on the Victorian coast, near Port Phillip Heads; and I have a single specimen from Tasmania, where, as in Victoria, the *P. Lalandi* abounds, while this is extremely rare. I have little doubt the gigantic specimen described by Mr. Kirk, from the west coast of the North Island of New Zealand, under the name *P. tumidus*, is only a very old and full-grown example of the same species, the size being double that

*NOTE.—Since the publication of the figures and description of *P. Lalandi* in our Decade XV., I have received several specimens from the Cape of Good Hope through the kindness of Mr. Trimen, of the South African Museum, Cape Town, fully bearing out the remarks I have made as to the identity of our Melbourne Craw-fish and the S. African one. Some of the specimens are very old and large, equalling our largest examples, and in these there is great irregularity in the tumidity of the branchial regions and consequent width of middle of carapace; the most extreme case of this was owing to a diseased condition due to the growth of multitudes of Mussel shells (*Mytilus*) on the gills. The healthy ones had the same proportion as I have figured for our common Melbourne species, which also varies in this respect. I should have drawn attention to the fact that, although in most specimens the color of the abdomen is almost uniform, yet in many examples there are whitish, irregular, dendritic, oblique markings on the lateral portions of each segment, and five, diverging, longitudinal ones on tail-flaps. These are rather more distinct on the Cape specimens; but perfectly identical markings are to be found on many of the Melbourne ones, as well as occasional whitish rings on the antennæ, irregularly varying in position and width.

Since the foregoing portion of this note was in type, I have received a copy from my friend, Professor Parker, of his paper from the Transactions of the N.Z. Institute, Vol. XIX., on the identity of the specimens referred to *P. Lalandi* from New Zealand by Hutton, and by Miers, with those referred by the same authors to Hutton's second species (*P. Edwardsi*) from the same locality, and it is satisfactory to find that we have independently made nearly similar observations. Professor Parker, having also got specimens from the Cape of Good Hope of the true *P. Lalandi*, thinks he finds a character to distinguish them from our Southern Australasian species, to which he provisionally continues the name *P. Edwardsi*. This is a couple of rows of tubercles on the anterior portion of the first abdominal segment, in front of the transverse furrow. I have never seen this extraordinary character in our Victorian specimens; but, on the other hand, *one of our Cape specimens is almost without them*, and Professor Parker notes one or two tubercles in this position in one of his New Zealand specimens. So, clearly, this character cannot separate the species. The second difference relied on by Professor Parker is the third abdominal segment having only one row of tubercles behind the transverse groove, in the New Zealand specimens, but two or three rows in his Cape ones. One of my Cape specimens *has only one row*, as in our ordinary Hobson's Bay examples, and I find our species occasionally exhibiting as many rows of tubercles in front of the groove as the Cape ones.

of our examples, accounting for the greater development of the spines on the inner edge of the second, third, and fifth joints of the first pair of legs in his figure.

EXPLANATION OF FIGURES.

PLATE 159.—Fig. 1, dorsal view of immature specimen, half the natural size. Fig. 1*a*, half of third abdominal segment, natural size. Fig. 1*b*, straight rostrum, natural size. Fig. 1*c*, front leg, half natural size.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Crustacea)

F.T.J.J. Wild del. et lith. Prof. M.c Coy direct. Steam. litho. Govt. Printing Office.

PLATE 160.

ASTACOPSIS SERRATUS (SHAW SP.), VAR. YARRAENSIS (McCOY).

THE YARRA SPINY CRAY-FISH.

[Genus ASTACOPSIS (HUX.). (Sub-kingdom Articulata. Class Crustacea. Order Decapoda. Section Macrura. Tribe Astacidea. Family Astacidæ. Sub-family Parastacinæ.)

Gen. Char.—Epistome long, flat. Antennæ with base fixed by edge of carapace; scale small; thoracic sterna narrow from the approximation of the large basal joints of the legs; twenty-one gills and one rudiment. Podobranchiæ six, destitute of upper posterior lamellæ and without dilatation of stem, and on first jaw-foot an epipodite with rudimentary branchial filaments; no podobranchiæ on last pair of thoracic legs; six anterior arthrobranchiæ on arthrodial membrane of second jaw-foot to penultimate leg; five posterior arthrobranchiæ on arthrodial membrane from third jaw-foot to penultimate pair of legs; four pleurobranchiæ on epimera of four last thoracic joints. Australia.]

Six months after I published in the Second Decade the illustration of the Murray Cray-fish (*A. serratus*), and about a month after I published in the Third Decade the account of the Yabber Cray-fish (*A. bicarinatus*), there was published the number of the Proceedings of the Zoological Society of London containing Professor Huxley's remarkable paper on the classification and distribution of the Cray-fish, and I gladly recognise the internal anatomical peculiarity of the Australian Cray-fishes which he has pointed out, characterising his family *Parastacidæ*, peculiar to the Southern Hemisphere, and differing from those of the other half of the world in the podobranchiæ having no lamina, and in the first joint of the abdomen being destitute of appendages in both sexes. In these the anterior edge of the carapace overlaps and fixes the basal joint of the antennæ, and the posterior thoracic sterna are very narrow; the coxopodites of the posterior thoracic legs are large and approximate in the midline, and the rostrum and antennary scale short, and the telson, or last joint of the abdomen, is never divided by a transverse joint; the podobranchiæ of the first jaw-foot or maxillipede is like an epipodite, but has some branchial filaments not present in the *Potamobiidæ*. The branchial filaments of the podobranchia and the coxopoditic setæ have hooked tips generally, not found in the northern family.

The two Cray-fish, *A. serratus* and *A. bicarinatus*, which I have figured in this work, differ from the Madagascar genus, *Astacoides*, to which I, with all the best continental writers, had referred them, in the larger number of the gills (*Astacopsis* having twenty-one and a rudiment, *Astacoides* only twelve fully developed). Placing *A. serratus* in the genus *Astacopsis*, which Professor Huxley has proposed, and which is entirely peculiar to Australia, the *A. bicarinatus* may be referred to a section of *Astacopsis* forming the sub-genus *Chæraps* of Erickson (if he be assumed to be wrong in saying the fifth legs have no gills), as, in our specimens, the gills in number, structure, and position are, as Huxley pointed out, like *Astacopsis*, but the podobranchiæ differing in having the inner anterior edge of the stem widened into an ala, covered with branchial filaments.

The old family, *Astacidæ*, is divided from Professor Huxley's observation into two groups, one inhabiting the Northern Hemisphere, for which the name *Potamobiidæ* has been suggested, including the genera *Astacus* and *Cambarus*, in which the gills from the first joint, or coxæ, of the five thoracic legs on each side have the upper part of the stem dilated posteriorly into a broad double, plaited lamina, and that of the adjacent jaw-foot is reduced to an epipodite without branchial filaments, none of the branchial filaments or setæ ending in hooks; the first abdominal segment always with appendages in the male, or in both sexes; those of the four following joints small; the telson, or middle piece of the tail-fin, divided transversely by a more or less perfect joint.

The second group, named *Parastacidæ*, confined to the Southern Hemisphere, containing the genera *Astacoides*, *Astacopsis*, *Chæraps*, *Engæus*, and *Parastacus*, is distinguished by the absence of the upper posterior laminæ to the podobranchiæ: having branchial filaments on the epipodite of the hind jaw-foot. The filaments of the podobranchiæ mostly end in hooked spines, as well as the setæ at their base and stems; the telson is not divided by a transverse suture; the first abdominal segment has no appendages in either sex, and those of the four following segments are large.

Our plate 160 illustrates a remarkable variety of the typical *A. serratus* of the Murray, common in the Yarra and its numerous affluents flowing southwards into the sea of the south coast of the colony; and as very few of the inhabitants of these river systems are identical (most of the species and many of the genera being dissimilar), this form is worthy of special note. It is usually less than half the size of the Murray individuals, being usually only five inches and rarely six inches long; it further differs in the whole thorax and abdomen above being of an intense Prussian-blue color, the spines, chelæ, and under surface ivory-white, with the membrane of the joints red. All the proportions and the number and disposition of the spines seem to me to agree so closely with the large pale Murray form, that, although so unlike at first glance, I have no doubt the southern race is merely a variety, which, for convenience of reference, may be distinguished by the name of the river in which it is chiefly found, from its mouth at Melbourne to its highest branches. The colors of those from the Watts River are particularly intense.

EXPLANATION OF FIGURES.

PLATE 160.—Fig. 1, male specimen, viewed from above, natural size. Fig 1*a*, same, viewed from below, showing the male openings in the base of the hind pair of legs, and the absence of appendages to the first abdominal segment. Fig. 1*b*, side view of same. Fig. 1*c*, top of head, magnified two diameters, to show details of rostrum. Fig. 1*d*, side view of portion of head, magnified two diameters, to show proportional dimensions of rostrum, antennary scale, and basal joints of antennæ. Fig. 1*e*, one of the abdominal appendages, magnified three diameters.

NOTE.—The color of the under surface, and chelæ and spines of upper surface, are rather too dark, and should be of an ivory-white with a slighter brown tinge.

FREDERICK McCOY.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XVII.

BY

FREDERICK McCOY, C.M.G., M.A., Sc.D. CANTAB., F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF THE NEW ZEALAND INSTITUTE; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.

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PREFACE.

In the first and second plates of this Seventeenth Decade, detailed figures, of the colours of life, are given for the first time of species of three more genera, *Lialis*, *Aprasia*, and *Pseudodelma*, of the snake-like group of Lizards so singularly abundant in Australia.

The third plate gives figures of the colours of life, also for the first time, of one of the magnificently coloured "Parrot Fishes" of our coasts, the *Labrichthys laticlavius*.

The fourth plate figures for the first time of the living colours a most beautiful new species of that splendidly coloured group of fishes popularly called "Wrasses" in England, the *Heteroscarus Macleayi* (McCoy).

The four following plates illustrate the details of further species of the genus *Cellepora*, so important to the geologist investigating our Tertiary rocks, as well as to the zoologist, from the specimens and descriptions presented by Mr. Macgillivray.

Plates 169 and 170 give detailed figures of a new species of Squid, or Cuttlefish (*O. Gouldi*, McCoy), of the interesting genus *Ommastrephes*, having a cone at the end of its internal dorsal pen.

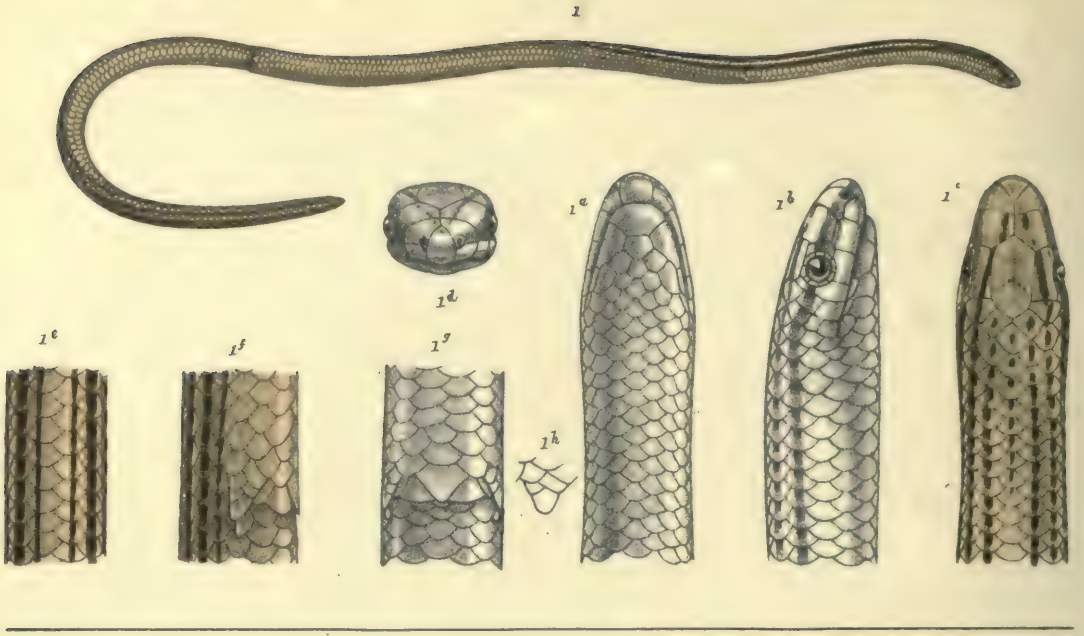
The succeeding Decades will illustrate as many different genera as possible, and will deal first, usually, with species of some special interest and of which good figures do not exist, or are not easily accessible.

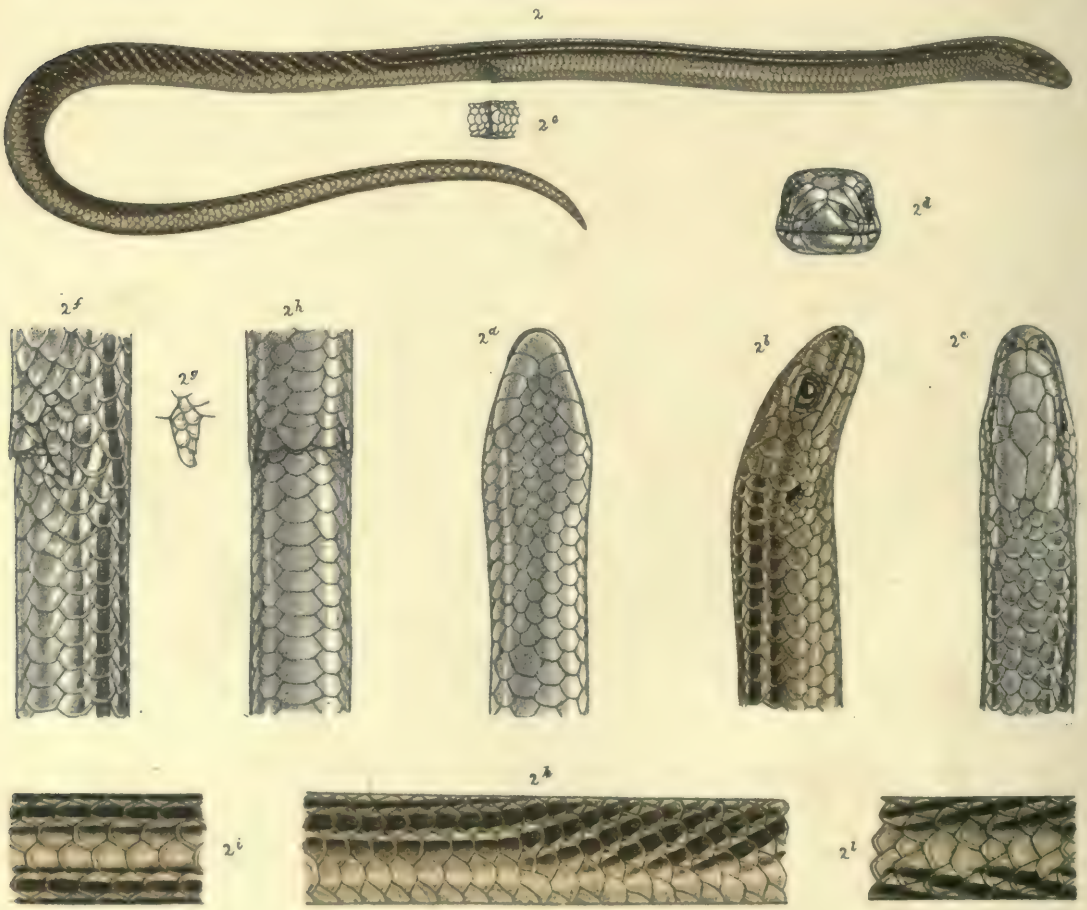
FREDERICK McCOY.

10th October, 1888.

ZOOLOGY OF VICTORIA

(Reptiles)





J. J. Wild del. et lith.

Prof. McCoy direxit

Steam Litho. Govt. Printing Office

PLATE 161.

LIALIS BURTONI (GRAY).

BURTON'S LIALIS.

[Genus LIALIS (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Pygopidæ.)

Gen. Char.—Body snake-like, very long, cylindrical, tapering. Head pointed, parietal bones united into a single one; teeth sharp, directed backwards, swollen at base; top of head covered with small, scale-like plates; external ear-opening obliquely oval; tongue elongate, tapering, bifid; scale-like rudiments of hind limbs very small. Scales soft, smooth, imbricating; two median abdominal rows and one median sub-caudal row larger than the others. Preanal pores few. Australia and Islands to N.E.]

DESCRIPTION.—Body and tail sub-cylindrical, very gradually tapering; tail, when perfect, exceeding the head and body in length. Head long, tapering, with straight sides, to a narrow, obtusely rounded tip; from tip of snout to anterior margin of eye equal to distance from anterior margin of eye to ear in some specimens, but only equals from posterior margin of eye to ear in others; a narrow, projecting angular ridge from nostril over eye to a little beyond ear, separating the flattened top of the head from the slightly concave cheeks; two rows of scales on prominent margin of lower lip continued some variable distance along sides of body, forming a perceptible ridge; approximate half of scales of each row usually coloured white with a dark outline, giving the erroneous appearance of two rows of scales smaller than the adjacent ones. Numerous small plates of top of head variable in size, shape and number; rostral plate bent under, so that the mouth opens behind front edge of snout, about four times wider than high; about 17 small upper labials. Nostril large, in posterior edge of a swollen nasal plate, with one or two post-nasal plates; loreal plates of cheek, between nostril and eye, very small, numerous, scale-like; eye small, separated from labials by two or three rows of loreal scales, with a narrow, circular, immovable eyelid, with one or two rows of minute scales; chin plate very large, sub-pentagonal; a row of seven or eight large, paddle-shaped plates, each with an abruptly narrowed posterior extension, separated from the lower labials by a row of very small, longitudinally oblong scales. Nineteen or twenty-one rows of scales round middle of body. Hind limbs extremely small, apparently covered by two or three scales, scarcely differing from the lateral ones of the body, which they follow. Preanal pores two on each side, large, notching posterior edge of the scales; about eighty pairs of enlarged median abdominal plates. *Colour:* Some specimens (as our figure 1) pale greyish-brown, lighter above, darker below, darkest on the cheeks, with a narrow white band from lower lip a variable distance along sides of body, usually edged with a very fine dark line; a similar white streak from nostril, running along angle over eye and ear a short distance along neck, and with a small, dark dot in centre of each scale of back (var. *L. punctulata*); others of richer brown, darker below, with about eight rows of large white spots on under side, and five or seven narrow, dark streaks along back, the middle one opening out into two on head, uniting again on snout (var. *L. Burtoni*); other specimens have dark, vertical markings on cheeks, and larger and darker triangular patches on

sides of lower jaws; some (as our figure 2) have the back plain, dotted, without streaks, as in the type *L. punctulata*, but with the large, white spots below, as in the typical *L. Burtoni*. *Measurements:* Tip of snout to base of leg-flaps, 6 in.; tail, 6 in. 6 lines; tip of snout to anterior edge of eye, 4 lines; tip of snout to ear, 8½ lines; diameter of middle of body, 3½ lines.

REFERENCES.—*Lialis Burtoni*, Gray, Cat. B. M. Lizards, p. 69; Ereb. and Ter., p. 5, t. 8, f. 2; Grey's Trav. Austr., v. 2, p. 437, t. 3, f. 1 + *L. bicatenata*, Gray l.c. + *L. punctulata*, Gray l.c. + *L. leptorhyncha*, Peters, Monatsberichte der Königlichen Preuss. Akad. der Wissenschaften zu Berlin, 1873, p. 605.

The genus *Lialis* I think, with Mr. Boulanger, contains only one species at present known, varying greatly in colour and slightly in the proportional length of the snout, which characters have been relied on by Gray and Peters in naming the supposed different species indicated in the synonyms. These lizards are even more like snakes than the *Pygopus*, from the almost imperceptible smallness of the rudiments of the hind limbs, scarcely larger or longer than an ordinary adjacent scale, and the immovable eyelids. The external open ear, however, and fleshy tongue indicate at a glance the true affinity to be with the lizards and not the snakes. The curious character of the single (coalesced pair) parietal bone in the skull, and also the sharp recurved teeth with swollen base, so different from others of the *Pygopidæ*, almost warrant the adoption of Gray's family *Lialisidæ* for the genus, which approaches the *Varanidæ* in this and in the premaxillary being single and produced backwards between the nasals. Our figure 1 gives the typical colouring of the variety named *L. punctulata* by Gray, in which a very distinct white labial band extends along the lower lip, and runs a variable length along each side of the body, separating a darker greyish brown under side from a much lighter, greyish brown upper side, and with a shorter narrow white band from nostril over eye beyond the ear; the cheek between these lines darker than any other part of the surface; most of the scales of the back with a small dark dot near middle. Our figure 2 shows the colouring half-way between that species and *L. Burtoni*, from Trinity Bay, having longitudinal dark streaks on top of head, and the large conspicuous white spots on dark greyish-brown under side, and vertical dark patches on side of cheeks and lower jaw, as in *L. Burtoni*, but with the lighter, plain, unstreaked upper

side, with a small dot in centre of each scale, as in *L. punctulata.* Other specimens in the Museum Collection have the five longitudinal brown streaks and rows of dark and light spots on whole of upper surface, as in the typical *L. Burtoni,* with rows of conspicuous white spots on darker under surface. All the varieties have the curious and most unusual colouring of the darker surface being below, instead of above, as usual.

The specimens found in Victoria, measured above, are smaller than those generally of warmer latitudes ; but I have a specimen in the Museum from Duke of York Island, of the size, shape, and colouring of our figure 1.

Not very uncommon in the Mallee Scrub and other warmer parts of Victoria.

EXPLANATION OF FIGURES.

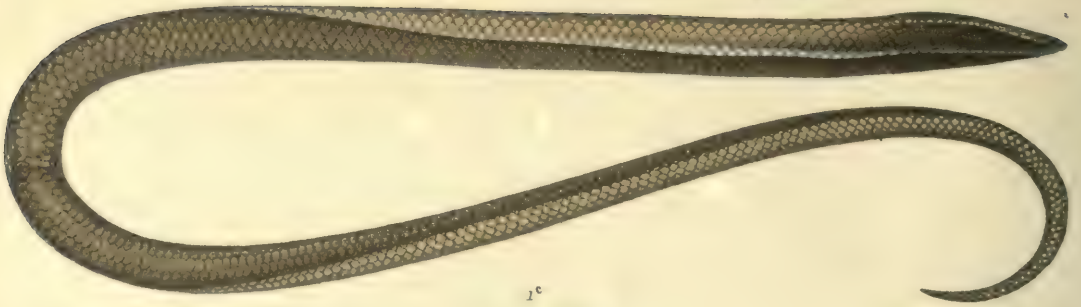
PLATE 161.—Fig. 1, plain coloured specimen of the variety named *L. punctulata*, natural size. Fig. 1*a*, under side of head, magnified three diameters, to show the large chin plate and lateral rows of paddle-shaped plates. Fig. 1*b*, top of head, magnified three diameters, showing plates of head. Fig. 1*c*, side view of head, magnified three diameters, showing large nasal plate, very numerous scale-plates of loreal region, eye with scaly lid, and ear. Fig. 1*d*, front view of tip of snout, magnified five diameters, showing wide rostral, inflected below, and edge of chin plate. Fig. 1*e*, side view of snout, magnified five diameters, showing large nasal with two post-nasal plates. Fig. 1*f*, posterior end of body and anterior end of tail, magnified three diameters, showing two rows of large abdominal and one row of large sub-caudal plates, four preanal pores, and the minute leg-flaps. Fig. 1*g*, side view of middle of body, magnified two diameters, showing upper dotted and lower plain scales. Fig. 1*h*, lower surface of body, magnified two diameters, showing proportion of two median rows of larger plates. Fig. 1*i*, scales of back, magnified two diameters. Fig. 2, variety, with conspicuous white spots, as in the type *L. Burtoni*, but without back streaks, natural size. Fig. 2*a*, lower side of head and part of body, to show disposition of large white and some dark spots, magnified three diameters. Fig. 2*b*, top of head, magnified three diameters, showing dark marks, longitudinal streaks (not found farther back on this specimen). Fig. 2*c*, side view of head, magnified three diameters, showing vertical dark marks and traces of longitudinal dark streaks. Fig. 2*d*, tip of snout, front view, magnified five diameters. Fig. 2*e*, side view of snout, magnified five diameters, showing nasal plates, with only one post-nasal. Fig. 2*f*, view of preanal pores and small leg flaps, magnified three diameters. Fig. 2*g*, scales of back unstreaked and dotted, as in *L. punctulata*, magnified three diameters. Fig. 2*h*, side view, magnified three diameters, showing relation of upper and under scales, with leg-flaps and preanal pores.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Reptiles)

1



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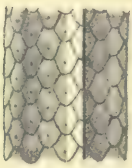

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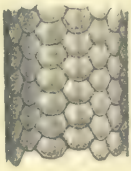

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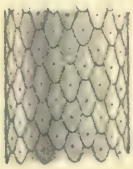

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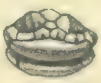

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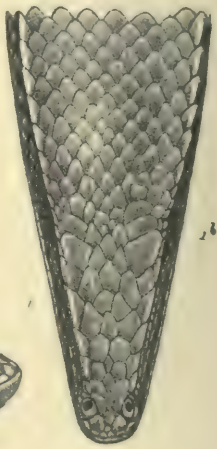

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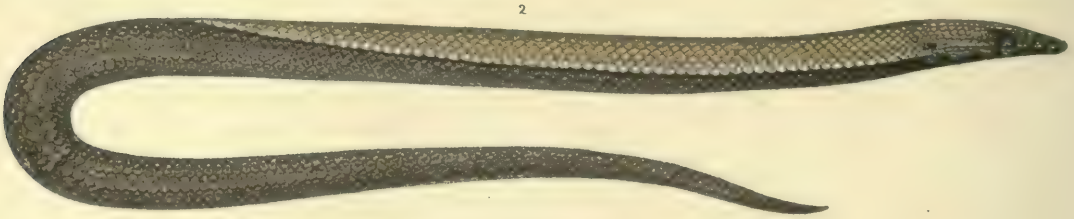

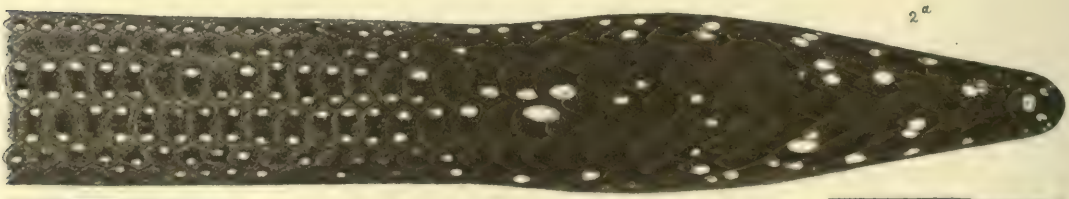

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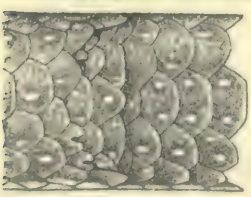

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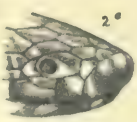

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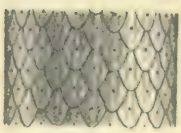

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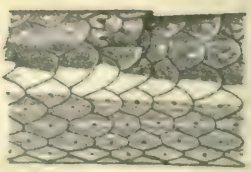

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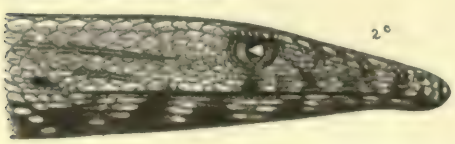

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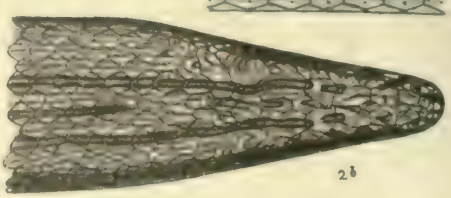


2b

D^r J. J. Wild. del. et. lith.

Prof^r Mc Coy direxit

Steam. Litho. Gov^t Printing Office

PLATE 162, FIG. 1.

APRASIA PULCHELLA (GRAY).

THE LINED APRASIA.

[Genus APRASIA (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Pygopidæ.)

Gen. Char.—Body and tail long and slender, cylindrical, tapering, vermiform; destitute of anterior limbs, posterior ones forming a very minute flap on each side of base of tail; covered with smooth, hexagonal scales, those below only slightly wider than those above. Head small, semi-elliptically rounded in front, cheeks vertical, muzzle projecting beyond lower jaw in front; one pair of large, quadrate nasal plates; one pair of freno-nasal large shields, covering the cheeks; one large, hexagonal vertex plate or pre-frontal; a pair of small superciliary plates on each side; rostral plate large; labial plates large, few; nostrils very small, near suture, between the tip of the front upper labial and the square nasal plate; vertex plate large, hexagonal; no parietal shields; eyes with a circular eyelid of a marginal series of small scales; pupil round; external ears none, the aperture being covered by the scales. Tongue rounded and slightly notched at tip. Parietal bones separate. Teeth small, blunt, with cylindrical base, pleurodont. Preanal pores none. Australia.]

DESCRIPTION.—Head scarcely wider than neck, semi-elliptical, pointed in front; rostral plate long, narrow, lower two-thirds nearly parallel-sided; the pointed upper-third end bent over to appear on upper surface of head, between the nasal plates, separating them nearly to their posterior margin; nasals large, quadrate, joining by a small portion of posterior inner edge above, with the nostrils pierced in the anterior outer angle, close to suture of first upper labial plate, which is small and quadrate; second labial plate about as long as the first, but rising higher to join the outer side of the freno-nasal; third upper labial smaller than second and indented above by the eye; fourth labial rising to nearly middle of eye behind. Prefrontal or freno-nasals hexagonal, larger than the nasals, joining in mid-line above, joining by one of their anterior edges to posterior edge of the nasal, joining vertex by inner posterior side, and joining temporal plate by middle posterior edge, joining small frenal or antocular plate by outer posterior side. Vertical pre-orbital or frenal plate in front of eye, three times higher than long. Vertex or frontal plate very large, hexagonal; no parietal nor occipital plates. Supra-orbital plates large, extending from long side of vertex plate to eye-lid outside, and prefrontal in front, and body scale behind. Mental plate large; first lower labials very large, reaching from mental to vertical from middle of eye, bent under the chin, and separate by a small hexagonal plate behind the mental. Scales of throat small, hexagonal. Twelve rows of hexagonal, smooth scales round the body, two middle belly rows larger and wider than the others. Three large preanal scales, with very minute rudimentary leg-flaps on each side, covered with two rows of three minute scales each, and slightly exceeding one of the back scales in length; circular eye-lid of one row of scales. *Colour:* Dull brownish yellow above, paler below, with six to nine longitudinal, narrow, dark-brown streaks, sometimes forming dots on the outer row on each side, the next inner streak strongest and going through the eye; rarely, a ninth, central, small, dotted streak on back. Length of head, 3 lines; from tip of snout to base of tail, 4 inches; diameter of middle of body, 2 lines.

REFERENCE.—Gray, Grey Jour. Exp. Aust., v. 2, p. 438, t. 4, f. 2 = *A. octolineata*, (Peters) Monatsberichte der Königlichen Preuss. Akad. der Wissenschaften zu Berlin, 1863, p. 233.

This beautiful little creature has the shark-shaped head of the Blind Worms or Worm Snakes, the front of the snout and curved rostral plate projecting in front of the mouth, probably to facilitate burrowing in the ground. In the situation of the hind leg-flaps of *Pygopus* and *Delma* there is a very minute triangular group of about three scales, much smaller than the others, and resting in a depression, no doubt representing the leg-flaps of those genera, and which has been overlooked by the older writers, although noticed by Mr. Boulanger. The absence of the external ear aperture also shows an approach to the Worm Snakes. The eyelids, however, and fixed jaws indicate their true affinities with the Lizards, from which, however, they depart more than any other form known. I have no doubt that Dr. Günther is correct in refering the *A. octolineata* of Professor Peters to this same species, as I find the streaks vary from six to nine, and the normal number of rows of scales for the present species is twelve.

The first Victorian specimen I have seen was presented to the Museum by my former pupil, Dr. E. Hearn, from Lake Wallace, where it had been turned up by the plough in a field. Subsequently I received another from Mr. Goldstein, who found it at Portland in April 1879.

EXPLANATION OF FIGURES.

PLATE 162.—Fig. 1, average specimen, natural size, but the tail shorter than its proper proportion, from having been lost and re-grown. Fig. 1*a*, top of head and neck, magnified five diameters, to show plates of top of head; showing also the unusual middle streak for a short distance in this specimen. Fig. 1*b*, side view of head, magnified five diameters, to show the scaly eyelid, pre-ocular or frenal plate, edge of supra-ocular plate, freno-nasal, nasal and labials. Fig. 1*c*, under side, to show large chin plate and post-mental plate, and enlarged first labial. Fig. 1*d*, front view of snout, to show relation of rostral to adjacent plates. Fig. 1*e*, top of middle of body. Fig. 1*f*, side view of base of tail, showing dorsal and ventral scales and minute leg-flaps, magnified five diameters. Fig. 1*g*, same, viewed from below, showing large preanal scales. Fig. 1*h*, leg-flap, more highly magnified.

FREDERICK MCCOY.

PLATE 162, FIG. 2.

PSEUDODELMA IMPAR (FISCHER).

FISCHER'S FALSE DELMA.

[Genus PSEUDODELMA (FISCHER). Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Pygopidæ.)

Gen. Char.—Body and tail very slender, gradually tapering. Head moderate, tapering to bluntly rounded snout. Gape wide. Only one pair of plates, meeting in middle, between nasals and prefrontal plate. Nostrils large, near anterior edge of nasals, which meet above; ear-opening oblique, moderately large. Eye with rudimentary scaly eyelid. Teeth very small, numerous, blunt. Scales of body in longitudinal rows, until a little beyond base of tail, beyond which the lateral rows extend abruptly, obliquely upwards and backwards from middle sub-caudal row. No preanal pores; two or three enlarged preanal scales. Posterior leg-flaps very small, of two rows of scales. Australia.]

DESCRIPTION.—Head narrow, semi-oval, bluntly rounded in front. Teeth very numerous, very minute, blunt. Tongue flat, scaly, deeply notched at tip. Rostral large, pentagonal or nearly triangular, about twice as wide as high, separating the nasal plates, except at their posterior superior angles. Nasal plates large, sub-trigonal or tetragonal, with a large nostril pierced near middle, meeting on the mid-line above, behind the apex of the rostral plate, and prolonged backwards nearly as far as posterior edge of first labial below. Fronto-nasal plates large, quadrangular, meeting by longest side in middle of top of head, acutely pointed in front, obtusely pointed behind, a narrow portion bent down on cheek, touching the first of a series of six small plates over the second, third, and fourth labials, extending from the nasal to the eye. One large, quadrate, antocular plate joining posterior edge of naso-rostral on each side. Pre-frontal or inter-nasal plate large, heptagonal, nearly as broad as long. Frontal plate heptagonal, longer than wide, acutely pointed behind. Parietals large, with a band-like plate on outer posterior side of each, with or without a small occipital plate between their posterior ends. Two rows of minute scales round the orbit, and three vertical rows of slightly larger vertical scales in front of it. Three supra-ocular plates joining two large temporal plates by their upper edges. Upper labials seven, the fourth longer, but less deep, than the others, underlying the eye, from which it is separated by a row of four or five small scales, the anterior one of which supports the posterior two out of the three vertical rows of small scales in front of the orbit. Chin plate moderate, rhombic. Lower labials three, the first meeting below, behind the chin plate; second largest also prolonged under sides of jaw, but not meeting in the middle; third twice the length, but only one-fourth the depth of the other two. Body scales hexagonal, imbricating, very smooth and glossy; two middle ventral rows wider than long; length and width of the others more nearly equal; fourteen or fifteen rows of scales round the middle of body (the middle row, when fifteen appear, being frequently absent for distances of six or seven scales long, and re-appearing; when absent, leaving only fourteen rows round the body). Leg-flaps covered with two rows of three scales each, the whole being double the length of the enlarged preanal scales, or nearly as long as three of the lateral scales. Scales on back of base of tail in longitudinal rows as far as about the twelfth scale, beyond which the lateral rows extend obliquely upwards and backwards, from the three larger inferior shields to the one or two irregular dorsal rows in middle of tail; about fifty-one pairs of large abdominal scales from hinder part of throat to vent, and about one hundred and twenty-six transversely enlarged, hexagonal plates in median row beneath tail.

Colour: Above greyish-olive, fading to greyish-white below; top of head dark-brown; two or three scales wide of middle of back and tail plain; on each side, three narrow white lines, with dark-brown bands of transverse spots between them, forming three or four longitudinal lines of narrow light, and dark broad, stripes on each side, running straight from head, longitudinally, as far as twelve scales beyond the vent, where they turn abruptly, obliquely upwards and backwards in accord with the change of direction at this point of the lateral caudal scales. *Measurements:* Snout to base of tail, 3 in.; tail, 6 in.; diameter of body at middle, 3 lines; length of leg-flap, 1½ lines; snout to ear, 4 lines; snout to eye, 1½ lines.

REFERENCE.—Archiv. für Naturgeschicte 1882, p. 287.

This genus differs from *Delma* in the more simply plated head, arising from only one pair, instead of two pairs, of large plates intervening between the nasals and inter-nasal or pre-frontal; and, further, by the singular, oblique direction of the lateral rows of scales on the sides of the tail. The instability of the median dorsal row of scales, which I have noted, is a curious character, giving in some parts an odd number of rows of body scales, and, in the other adjacent parts, an even number. Fischer's figure in the Archiv. für Naturgeschicte, of the natural size, is very inexact, and, especially, the leg-flaps are represented as far too long. He is also certainly in error in supposing the teeth to be absent, as I find they are very numerous and blunt, but, of course, very minute and not easy to see.

Not very uncommon near Melbourne.

The specimen figured was presented by D. Kershaw, who found it under stones, near junction of Yarra and Merri Creek.

EXPLANATION OF FIGURES.

PLATE 162.—Fig. 2, average specimen, natural size. Fig. 2*a*, under side of head and neck, magnified three diameters, showing large labials, small throat scales, and suddenly enlarging two rows of scales of belly. Fig. 2*b*, side view of head and neck, enlarged three times, showing characteristic plates. Fig. 2*c*, top of head and neck, magnified three diameters, showing head plates, and the median dorsal row of scales following occipital scale, then absent, then re-appearing for three scales, and then being absent for hinder portion as far as figured. Fig. 2*d*, front view of snout, magnified three diameters, showing form of rostral and mental plates. Fig. 2*e*, three preanal scales and minute leg-flaps, natural size, from below. Fig. 2*f*, side view of leg-flap and adjacent scales, magnified three diameters. Fig. 2*g*, leg-flap, magnified. Fig. 2*h*, under side of last abdominal, enlarged preanal scales and sub-caudal scales, magnified three diameters. Fig. 2*i*, upper side of middle of back. Fig. 2*k*, side view of anterior part of tail, showing change from longitudinal to oblique rows of scales, magnified three diameters. Fig. 2*l*, upper side of middle of tail, magnified three diameters.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Fishes)

A. Barthelomew del. et lith.

Prof. M.Coy, direxit

Steam Lithic Government Printing Office

PLATE 163.

LABRICHTHYS LATICLAVIUS (RICH, SP.).

THE BROAD-STRIPED, OR SENATOR, PARROT-FISH.

[Genus LABRICHTHYS (BLEEKER). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Sub-order Pharyngognathi. Family Labridæ.)

Gen. Char.—Body moderately compressed, oblong; snout narrow, projecting; scales large; operculum scaly, cheeks more or less scaly; preoperculum not serrated. Lateral line continuous. Teeth sharp, conical, in one or two rows in upper jaw, usually 1 or 2 large canine teeth on each side in front, and often a large, conical, posterior canine tooth at angle of mouth in upper jaw. Fins, 9 spinous and 11 branched rays in dorsal, and 3 spinous and 10 branched in anal. Pacific and Indian Archipelago.]

D. 9 + 11; V. 1 + 5; P. 12; A. 3 + 10; L. lat. $26\frac{3}{10}$.

DESCRIPTION.—Body moderately slender, depth about $3\frac{3}{4}$ in total length, including caudal. Head with convex profile, small, about one-fourth of total length, including caudal; top of head and cheeks set with coarse, perforated granules, scattered above, but running into nearly vertical, branched ridges below; a sub-vertical row of 6 or 7 large scales, rather nearer the edge of the preoperculum than the eye, extending from about the level of top of eye, curving forward below to about level of corner of mouth; a row of 12 rapidly decreasing, conical teeth in upper jaw, the first (or canines) twice as large as the next; a conical canine, nearly as large as the front one, projecting outwards and forwards from corner of mouth; a second row of smaller and more numerous teeth within the outer row; a similar row of eleven decreasing from the large front canine in lower jaw; two vertical rows of large, rounded scales on anterior part of operculum, with one or two forming an imperfect third row; posterior membranous margin of operculum forming a narrow, rounded, smooth lobe, forming two sides of an isosceles triangle from upper junction; gill-opening large, curved. Scales of body large, rounded, thin-edged, with fine, granular, flexous, radiating striæ, strongest at middle; those of lateral line with from 4 to 8 flexuous, dichotomous, branching tubes, set with porous granules, the five last running to middle of tail from level of last dorsal ray, one scale's width lower than anterior ones; 26 scales along lateral line, 3 above and 10 below; no scales on dorsal fin. *Fins:* Spinous part of dorsal of 9 spines, slightly less elevated than the posterior portion, of 11 branched rays; ventral rhomboidal, acutely pointed, from second branched ray being longest, 1 spinous and 5 branched rays; pectoral obtusely rounded, of 12 rays; anal of 3 short spinous, and 10 longer, branched, rays slightly increasing, so that the last is longest; caudal sub-truncate, obtusely rounded. *Colour:* Body, back and cheeks rich sap-green, with 3 broad, bright, purplish, chestnut madder bands, one from temple behind the eye to the end of the caudal; a second, wider, from angle of operculum joins the upper one about 3 rays from vertical of end of dorsal; and a third, broadest, occupies the lower part of body over anal and lower portion of tail, connected with the middle one by a large blotch of same colour at anterior portion of anal; each of these stripes is edged by a narrow interrupted line of ultramarine-blue. Throat and belly in front of anal purplish-white, with longitudinal, broken, flexuous lines of pale yellow and blue; head with long, flexuous

blue lines radiating from the eye, the intervening spaces varying irregularly, either the green or purple of the body in different specimens; dorsal fin sap-green at base, irregularly clouded with reddish and pale blue; a definite, narrow, continuous edging of bright blue, and numerous, ultramarine-blue, round spots on membrane of hinder part of dorsal in most specimens, in some specimens pale purple with narrow blue edge, without spots, but clouded with blue in front, and dull red behind; anal sap-green at base with a blue basal line, the marginal half dark-purplish with a narrow blue line between it and the green, and a bright blue, narrow edge and numerous round, blue spots on membranes; caudal with green of body extending along upper edge and middle, as narrow bands; rest of membrane of the purplish tint of body stripes, with a broad, darker band at posterior third; rays and round spots on membrane bright blue (in some specimens these blue spots extend over lower, body purplish, stripe to anterior end of anal fin); pectoral fin bluish-green at base, the rest of the membrane colourless, but the rays dark-greenish, except a broad margin of ends of branched rays, red; ventral nearly colourless, tinged with pale purplish and bluish. Iris with orange, round pupil, with blue and green circles in middle, and outer orange circle. Length, 11 in. 7 lines; snout to orbit, 10 lines; snout to end of operculum, 2 in. 10 lines; snout to front of dorsal, 3 in.; depth of body, 3 in.; height of middle of dorsal, 1 in.; length of ventral, 1 in. 5 lines.

REFERENCE.—Zool. Proc. 1840: Er. and Ter., Fish, p. 128, t. 56, f. 3-6.

This is one of the most beautiful of all the Wrasses, called Parrot-fishes in Australia, and varies considerably in the extent of the blue spotting of the fins and in the intensity and extent of the body colours. I have not seen any vermilion line indicated in some of the second-hand, published descriptions of the colouring, and think the parts so named are always blue.

Not very uncommon in Hobson's Bay. Our specimens were got in February, August, and September. It has not been figured of the natural colours before.

EXPLANATION OF FIGURES.

PLATE 163.—Fig. 1, average specimen, two-thirds of natural size. Fig. 1*a*, outline, to show granules, row of scales on cheek, and two rows with imperfect third row of large scales of operculum. Fig. 1*b*, teeth of upper and lower jaws, twice natural size, showing anterior large canines, and the posterior canines of upper jaw. Fig 1*c*, inner row of teeth in upper jaw, four times the natural size. Fig. 1*d*, scale from above lateral line, twice the natural size. Fig. 1*e*, scale from lateral line, twice the natural size. Fig. 2, dorsal fin of another specimen.

FREDERICK MCCOY.

A. Bartholomew lith. et del.

Prof. M.c Coy direxit

Steam lithic Inst. Printing Office

PLATE 164.

HETEROSCARUS MACLEAYI (McCOY).

MACLEAY'S WRASSE.

[Genus HETEROSCARUS (CASTLENAU.) (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Sub-order Pharyngognathi. Family Labridæ.)

Gen. Char.—Upper jaw longer than the lower; teeth united together, forming a sharp cutting edge on both sides, with a distinct median suture in upper jaw; indistinct or none in lower jaw. Scales large; 14 to 16 spinous rays in dorsal; head without scales, granular and porous; cheeks with imbedded, impressed non-imbricating scales; large scales on operculum; lateral line continuous. Australia.]

D. 16 + 8; A. 2 + 13; C. 14; P. 13; V. 1 + 4; L. lat. $33\frac{5}{10}$.

DESCRIPTION.—Body oblong, compressed, height twice and two-thirds in total length (without caudal); length of head nearly three times in same length; thickness twice and a half in depth. Head semi-oval; upper pair of anchylosed sets of teeth overlapping the under pair; angle of mouth not reaching level of anterior edge of orbit. Three rows of large scales on the operculum; edge of operculum membranous and smooth, except at angle, which is striated; anterior part granular and porous; margin of preoperculum striated, edge serrated; all the pieces of the head with irregular, coarse granules; forehead between the eyes very slightly convex. *Fins:* Dorsal commencing at back of head, of 16 spinous and 8 jointed, branched rays, first four rays longest and terminating in long, very slender, flexuous filaments; jointed rays longer than immediately preceding spinous rays. Anal commencing under about the tenth dorsal ray, of 2 spinous and 13 jointed branched rays, terminating slightly behind the dorsal; caudal of 14 rays (shape uncertain). Ventrals ovate, of 1 spine and 4 branched rays. Pectoral large, ovate, of 13 rays. *Scales:* Large, rhombic, with concentric wrinkles of growth and very fine, longitudinal, rough flexuous striæ, serrating the posterior edge; 33 along lateral line; 5 above lateral line at middle of body and 10 below. *Colour:* Head clouded with indian-red and olive-green, passing to yellow ochre on throat; one narrow band of ultramarine-blue, edged with blackish-blue, extends with an upward curve from middle of lip, touching bottom of orbit, and extending straight towards upper base of pectoral, but not extending beyond the granular part of head on to the scales of operculum, which are dull indian-red; another, similar, blue streak goes from angle of mouth, a little beyond vertical of posterior edge of orbit, with a few, irregular, broken streaks or spots, to beyond edge of preoperculum; a third, similar streak extends backwards from middle of posterior edge of orbit to end of granular surface; one or two elongate, similar spots between this upper and the middle streak. Body with three broad, longitudinal stripes of rich indian-yellow, the spaces between which, and also the back, of a rich, reddish, purple, brown, madder colour (like lees of red wine), these three lateral stripes broken into spots at their posterior end, clouded on the back, and spotted with green; belly and end of tail sap green; all the fin rays green, except the pectoral, which has them orange-yellow with colourless membrane; ventrals greenish at base and margin, with a broad intermediate band of dark green beyond middle, edged with narrow margins of opal blue, like streaks of head; anal green at base, then dull orange, which is also at margin; a broad intermediate band

of dull reddish colour of body, edged above and below with narrow peach-blossom colour, breaking into some small spots at posterior end. Anterior part of dorsal dull orange-yellow at margin, pinkish and purple below, with a narrow band of peach-blossom colour edged with purple below the margin; posterior portion greenish at base, irregularly blotched with dark red; all the rays dull green. Iris dull orange.

Measurements.	Ins.	lines.
Length from tip of snout to base of caudal	9	3
" " " anterior edge of orbit	0	9
" " " end of operculum	3	0
" " " base of pectoral	2	6
" " " first dorsal spine	2	5
" " " base of ventral	3	4
" " " first spine of anal	5	6
" " " last ray of dorsal	7	6
Depth of body	3	6
Length of 1st dorsal spine	2	0
" filaments beyond ditto	0	9
" last ray of dorsal	1	9
" pectoral	1	9
" ventral	1	7
" first spine of anal	1	0
" last ray of anal	1	6
Diameter of eye	0	6
Space between eyes	0	9

Three scales in a space of six lines at middle of body.

The *Heteroscari* are among the rarest and most beautiful of the Victorian "Wrasses," as somewhat similar fishes are popularly called in England. The present species, like the *H. filamentosus* (Cast.), has very long flexible filaments terminating the four first dorsal spines, but it differs from it and the other known species, in the number of the fin rays, number of the scales, and in the colouring. The lower jaw group of anchylosed teeth is not so distinctly divided as the upper, but still has a distinct suture near the margin, although becoming a mere shallow groove towards the base.

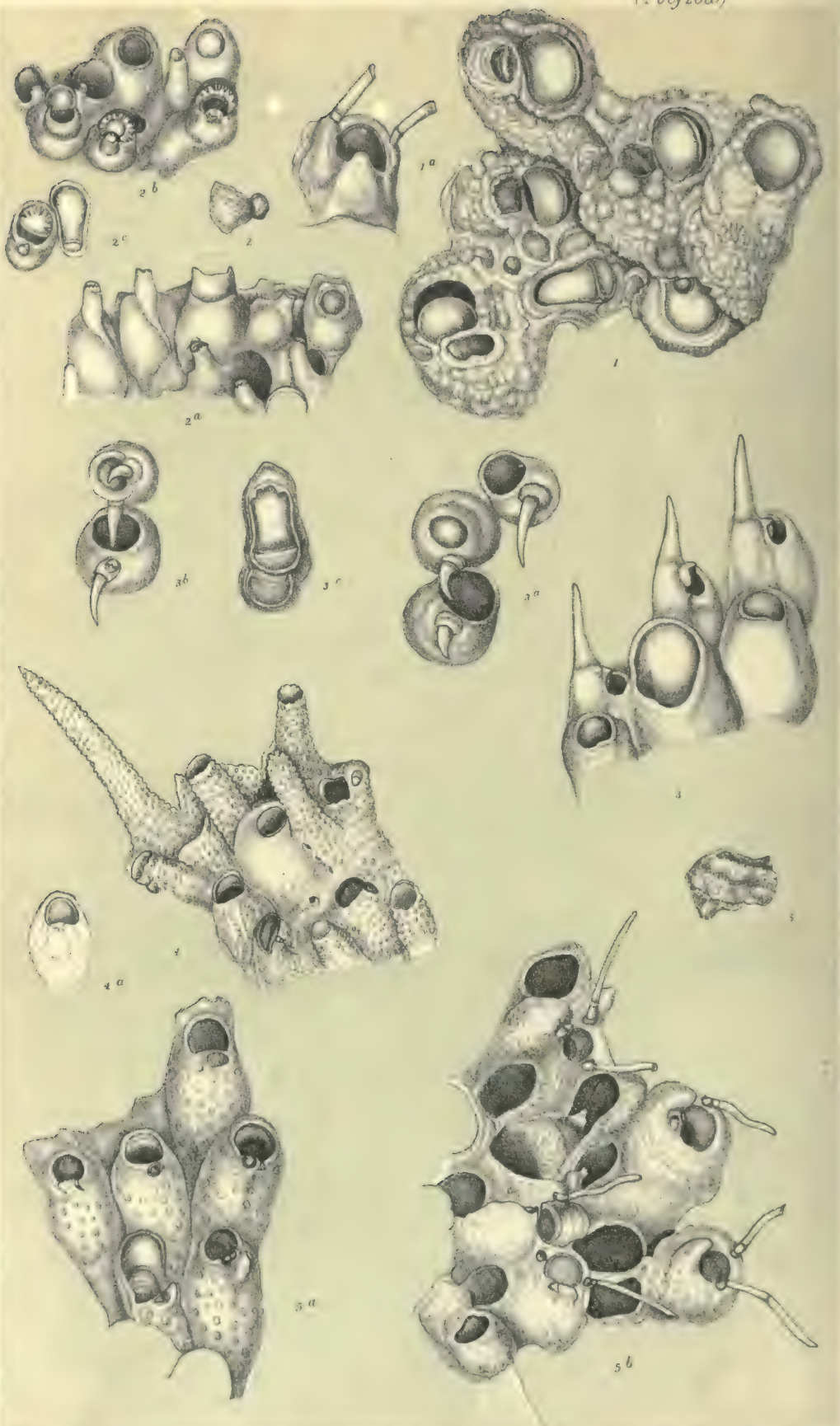
The form of the posterior edge of tail is uncertain from having been broken in the figured specimen, but was probably slightly notched like the other species.

I have only seen one specimen, the one figured, from Portland.

Explanation of Figures.

Plate 164.—Fig. 1, side view, three-fourths natural size. Fig. 1*a*, outline of head, to show pitting and granulation of anterior part, the striation and serration of margin of preoperculum, and the rows of large scales on posterior part of operculum, natural size. Fig. 1*b*, front view of head, showing anchylosed teeth, natural size (the lower suture should be a little longer). Fig. 1*c*, inside view of front edge of upper jaws, showing the anchylosed teeth united into two pieces, divided by the median suture, magnified two diameters. Fig. 1*d*, scale from base of anal fin, twice the natural size. Fig. 1*e*, scale from above lateral line, twice the natural size. Fig. 1*f*, scale from lateral line, twice the natural size.

Frederick McCoy.



F. T. Mueller del.

Prof. McCoy direxit.

Steam. lith. Govt Printing Office.

PLATE 165, FIG. 1.

CELLEPORA SIMPLEX (McG.).

[Genus CELLEPORA (FABRICIUS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Celleporidæ.)

Gen. Char.—Zoarium crustaceous, adnate or glomerulous, or foliaceous and partly free, or massive or ramose. Zoœcia erect and confused in the central parts, decumbent at the growing edges; lower lip straight or nearly so and entire; one or more rostral processes, usually bearing avicularia, in the neighbourhood of the mouth, but sometimes absent; usually numerous vicarious avicularia of various forms, frequently raised on calcareous elevations.*]

DESCRIPTION.—Zoarium encrusting or adnate. Zoœcia large, nearly vertical, slightly projecting; mouth very large, semi-circular above, with a wide, very slightly arched lower lip; occasionally a slightly elevated, broad mucro below the mouth, with a small triangular avicularium having a smooth or serrated beak, or replaced by a large, broad avicularium; in some young zoœcia, a short, articulated spine on each side of the mouth. Vicarious avicularia with moderate sized, broadly ligulate mandibles.

Port Phillip Heads.

The specimen from which the figures have been taken is recumbent, measures 4½ by 3 in., and numerous layers have been superposed on the upper surface until at one part the thickness is nearly half an inch. Below the mouth is sometimes a mucro with a small avicularium, or an avicularium of much larger size without a mucro, as in the figure. The colour is brown.

EXPLANATION OF FIGURES.

PLATE 165.—Fig. 1, showing zoœcia with large avicularia below the mouth, and vicarious avicularia. Fig. 1*a*, single zoœcium near growing edge, showing mucro and articulated spines.
PLATE 168.—Fig. 7, Chitinous parts.

PLATE 165, FIG. 2.

CELLEPORA DIADEMA (McG.).

DESCRIPTION.—Zoarium small, adnate, yellow. Zoœcia short, nearly horizontal at the growing edge, more vertical internally; mouth sub-circular; in many of the younger zoœcia a sub-oral columnar mucro, carrying on its apex a small avicularium

* The genus *Cellepora* has been divided into the sections *holostomata* and *schizostomata*, the first with the lower lip entire, and the inferior edge of the operculum straight, the second with the lip fissured, and the operculum with a corresponding rounded or tongue-shaped process. It seems to me that these distinctions ought to be considered generic, as in other similar groups; and I would retain the name of *Cellepora* for the former and propose that of *Schismopora* for the latter. The *Celleporæ* are usually of large size, massive, decumbent or erect, or bilaminate and variously branched. The *Schismoporæ*, on the contrary, are mostly of small size, although occasionally large, as *S. megasoma* and *S. (Cellepora) Eytonensis* (Busk), and are frequently glomerular.

with a serrated beak; older zoœcia, especially the fertile, with the peristome of the lower lip produced forwards and frequently with a short columnar process, surmounted by an oval avicularium. Oœcia globular, reclinate, with a semi-circular area in front, bounded by a narrow raised line, along the margin of which is a series of short, concentric, triangular marks. Scattered vicarious avicularia with spatulate mandibles.

Port Phillip Heads, a single specimen, Mr. J. Bracebridge Wilson.

The aviculiferous process in the young marginal zoœcia has considerable resemblance to the semi-spiral tube in *Lagenipora nitens*, which possibly ought to be referred to this genus.

EXPLANATION OF FIGURES.

PLATE 165.—Fig. 2, specimen, natural size. Fig. 2*a*, young zoœcia. Fig. 2*b*, older zoœcia and oœcia. Fig. 2*c*, oœcium and vicarious avicularium.

PLATE 165, FIG. 3.

CELLEPORA SPICATA (McG.).

DESCRIPTION.—Zoarium forming bilaminate folds. Zoœcia at the growing margin nearly horizontal, oval or barrel-shaped, smooth or very minutely and sparsely granular; mouth semi-circular, nearly straight below; a long, sharply conical rostrum projecting from one side of the lower lip, with a small avicularium overhanging a notch at the base. In older parts the zoœcia nearly vertical, very much confused; a short pre-oral rostrum with basal avicularium; sometimes a long, trumpet-shaped rostrum, surmounted by an avicularium, from the side of the mouth; occasionally more than one rostrum and sometimes the mouth unarmed, semicircular or oval, and with the part below the lower lip thin and projecting. Oœcia cucullate, sub-immersed, smooth, a conical rostrum rising from a thickened base on the anterior surface over the middle of the marginal lip, with a small avicularium (frequently absent) at the base.

Port Phillip Heads.

EXPLANATION OF FIGURES.

PLATE 165.—Fig. 3, zoœcia from growing edge. Figs. 3*a* and 3*b*, zoœcia and oœcia from the central parts. Fig. 3*c*, vicarious avicularium.

PLATE 168.—Fig. 8, opercula.

PLATE 165, FIG. 4.

CELLEPORA CIDARIS (McG.).

DESCRIPTION.—Zoarium adnate. Zoœcia ovate, very irregularly arranged; surface finely granular; mouth straight below; below the mouth, at one side, a horizontal elevation, at the inner extremity of which is an avicularium with a small semicircular mandible and serrated beak. At the front of or between the zoœcia are numerous tall, stout, hollow, erect, acuminate or blunt processes, thickly and strongly granular or tubercular on the surface. Oœcia of moderate size, globular, sub-immersed.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

EXPLANATION OF FIGURES.

PLATE 165.—Fig. 4, portion magnified, showing the large processes, several of which have been broken across. Fig. 4*a*, single young zoœcium.

PLATE 165, FIG. 5.

CELLEPORA BISPINATA (BUSK).

DESCRIPTION.—Zoarium encrusting. Zoœcia long, distinct at the growing edge, irregularly heaped and confused in other parts, ovate, granular; mouth at first with a straight lower lip, beneath which is subsequently developed a small or, occasionally, a large blunt mucro, on the inner surface of which is situated a small avicularium with the rounded mandible pointed downwards; a long, stout, articulated spine on each side of the mouth above. Oœcia sub-globular, granular.

REFERENCE.—Busk, Brit. Mus. Cat., Mar. Pol., pt. ii., p. 87, pl. CXX., figs. 1, 2.

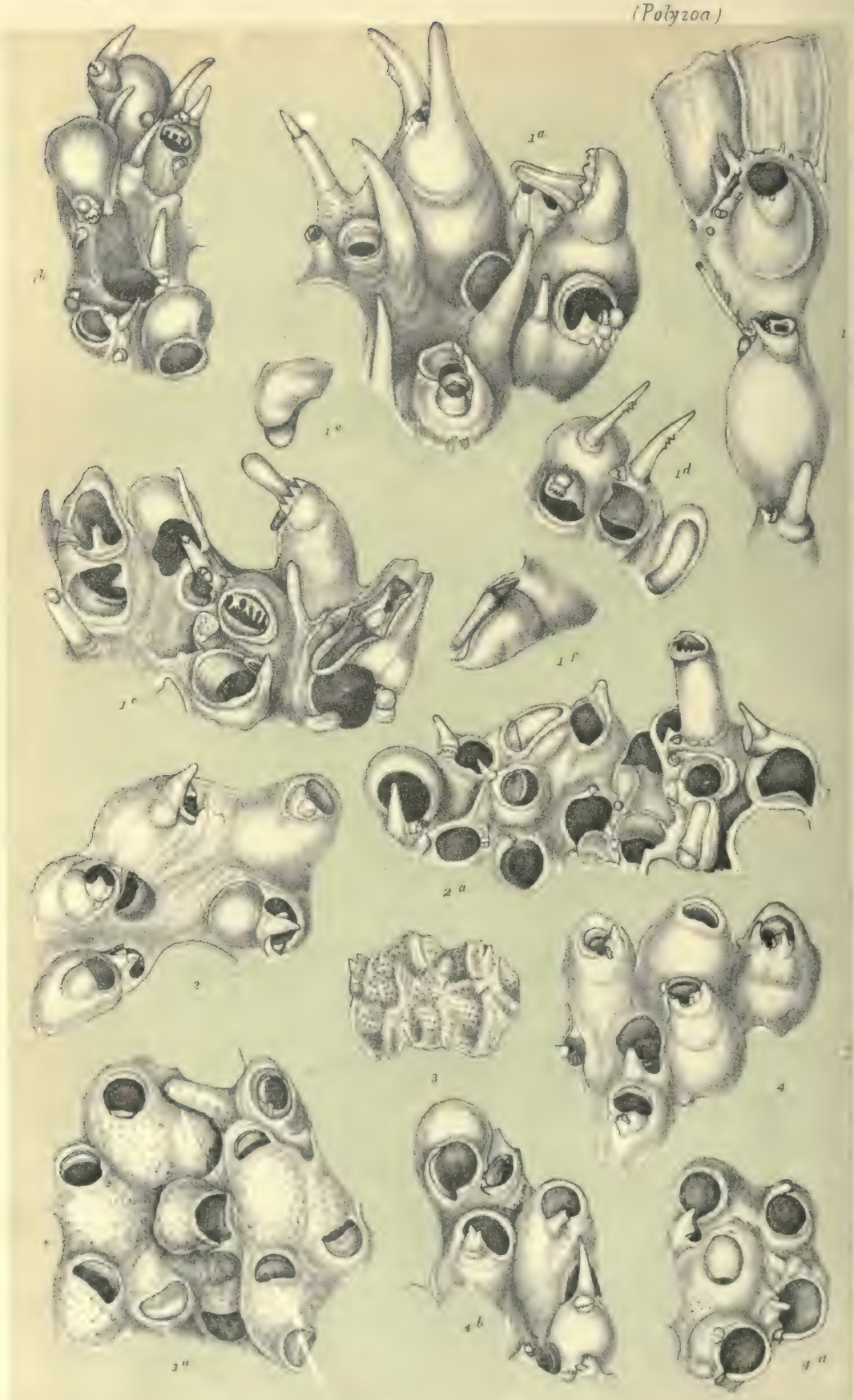
Port Phillip Heads; Portland, Mr. Maplestone; Warrnambool, Mr. Watts.

There can, I think, be no doubt that this is the species described by Busk, and that it has no connection with the *Discopora albirostris* of Smitt, as supposed by that author, from which it is readily distinguished by the oral spines being distinctly articulated, and by the rostrum being short and blunt.

EXPLANATION OF FIGURES.

PLATE 165.—Fig. 5, specimen, natural size. Fig. 5*a*, portion from growing edge of same, magnified. Fig. 5*b*, portion from older part, showing also a commencing and fully formed oœcium.

PLATE 168.—Fig. 9, operculum.



P. H. Macgillivray del.
J. Kipper lith.
Prof. McCoy direxit.
Steam Litho. Govt. Printing Office

PLATE 166, FIG. 1.

CELLEPORA VERRUCOSA (McG.).

DESCRIPTION.—Zoarium expanded, adherent or partially free; surface nodulated, and covered with narrowish verrucose elevations; colour brown. Marginal zoœcia recumbent, elongated, smooth, distinct at the extreme margin, farther back with the edges fused together; primary mouth arched above, straight below, with two short, stout, rigid spines; subsequently the sub-oral portion of the zoœcium largely projecting, and a long thin pre-oral rostrum becoming developed to one side of the lower lip, having a deep notch at its base, with an avicularium with oval mandible mostly turned inwards; in older parts of the zoarium the zoœcia more vertical and confused, the lower lip with a row of serrated denticles internally. Oœcia globose, not very prominent. Vicarious avicularia on stout, columnar elevations, with large spatulate mandibles and usually serrated beaks.

Portland, Mr. Maplestone.

The only specimen I have seen measures $5\frac{1}{2}$ by 3 inches, and is of a light brown colour. It is thick, from the superposition of several layers. The surface is covered with verrucose ridges and separate verrucose or mamilliform elevations. The mouth of the fully formed zoœcium is usually smooth and slightly hollowed below, and there is internally a row of simple or serrated denticles, usually obscured by the peristome. The oral rostrum frequently has a serrated projection about half-way towards the summit, probably concealing an avicularium. The vicarious avicularia are of large size, usually elevated on thick columns, with long, broadly ligulate or spatulate mandibles closing on strongly serrated beaks. The oœcia are rounded and occasionally have a conical spine, with or without an avicularium at its base, on the anterior surface.

An inspection of the figures, from different parts of the same specimen, well illustrates the protean characters which may be found in a single species of this difficult genus. The serrated denticles inside the lower lip are usually concealed by the growth

of the peristome, and thus seem to be absent. Of the large vicarious avicularia, also, some have the beaks smooth, while others have them strongly serrated.

EXPLANATION OF FIGURES.

PLATE 166.—Fig. 1, zoœcia at growing edge. Fig. 1*a*, a portion farther back, showing oral processes and a vicarious avicularium with strongly serrated beak. Figs. 1*b* and 1*c*, other portions showing denticulate mouths of zoœcia and oœcia. Fig. 1*d*, two oœcia with anterior rostra. Figs. 1*e* and 1*f*, vicarious avicularia with smooth rostra.

PLATE 168.—Fig. 15, chitinous parts.

PLATE 166, FIG. 2.

CELLEPORA FOLIATA (McG.).

DESCRIPTION.—Zoarium large, base broad and loosely adnate, raised into irregular, thick, erect, bilaminate lobes, anastomosing and frequently perforated at the base; edges irregular and surface verrucose or irregularly mamillated. Marginal zoœcia nearly horizontal, rather short; older zoœcia vertical, confused, close; mouth deep, straight or slightly hollowed below; operculum light coloured; pre-oral rostrum, on younger zoœcia, with a small, overhanging avicularium with denticulate beak, produced into a moderate sized conical process. Vicarious avicularia with ligulate or long triangular mandibles, and usually uncinate and denticulate beaks; occasionally an avicularium with a very narrow mandible situated on the summit of a tall, thick column.

Portland, Mr. Maplestone.

The specimen I have measures 7 inches by 4, and the height of the highest foliations is 3 inches. It is of an ashy-grey colour. The base is broad and almost entirely covered by the thick, erect lobes which run in a sub-parallel direction across the zoarium. These are more numerous and of much greater size and thickness than in *C. prolifera*, from which also it differs somewhat in the structure of the operculum.

EXPLANATION OF FIGURES.

PLATE 166.—Fig. 2, young marginal zoœcia. Fig. 2*a*, zoœcia from older part of same specimen, showing also growing oœcia, sessile vicarious avicularia, and small avicularium on thick column.

PLATE 168.—Fig. 10, operculum.

PLATE 166, FIG. 3.

CELLEPORA INTERMEDIA (McG.).

DESCRIPTION.—Zoarium loosely adnate or partly free. Zoœcia large, confused, oblique or nearly horizontal, faintly granular; mouth large, straight below; rostrum usually wanting, but in some zoœcia existing as a small elevation below the mouth, with a conspicuous avicularium on the side. Oœcia small, globular, sub-immersed, faintly granular. Vicarious avicularia scattered irregularly, with large spoon-shaped mandibles.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1868.

Queenscliff.

EXPLANATION OF FIGURES.

PLATE 166.—Fig. 3, specimen, natural size. Fig. 3*a*, portion magnified.

PLATE 166, FIG. 4.

CELLEPORA PROLIFERA (McG.).

DESCRIPTION.—Zoarium expanded, loosely adnate, surface verrucose and raised into thin, bilaminate, ligulate or wider ridges expanding upwards. Marginal zoœcia horizontal, barrel-shaped; central zoœcia confused, immersed; mouth nearly straight below; pre-oral rostrum with a small avicularium at one side of a sinus of the peristome, and a very short, conical process; this process frequently absent, and the avicularium then situated on one side of the oral sinus. Oœcia globular, smooth or finely granular.

Portland, Mr. Maplestone.

Of a reddish or yellowish-brown colour. The largest specimen I have examined measures 6 by 4½ inches in diameter. It occurs as a comparatively thin, loosely adnate crust, covered with rounded mamillary projections. These projections usually expand upwards, the sides anastomosing with others so as frequently to leave spaces bridged over by their junction.

EXPLANATION OF FIGURES.

PLATE 166.—Fig. 4, growing edge, magnified. Figs. 4*a* and 4*b*, other portions of the same specimen.

PLATE 168.—Fig. 11, opercula.

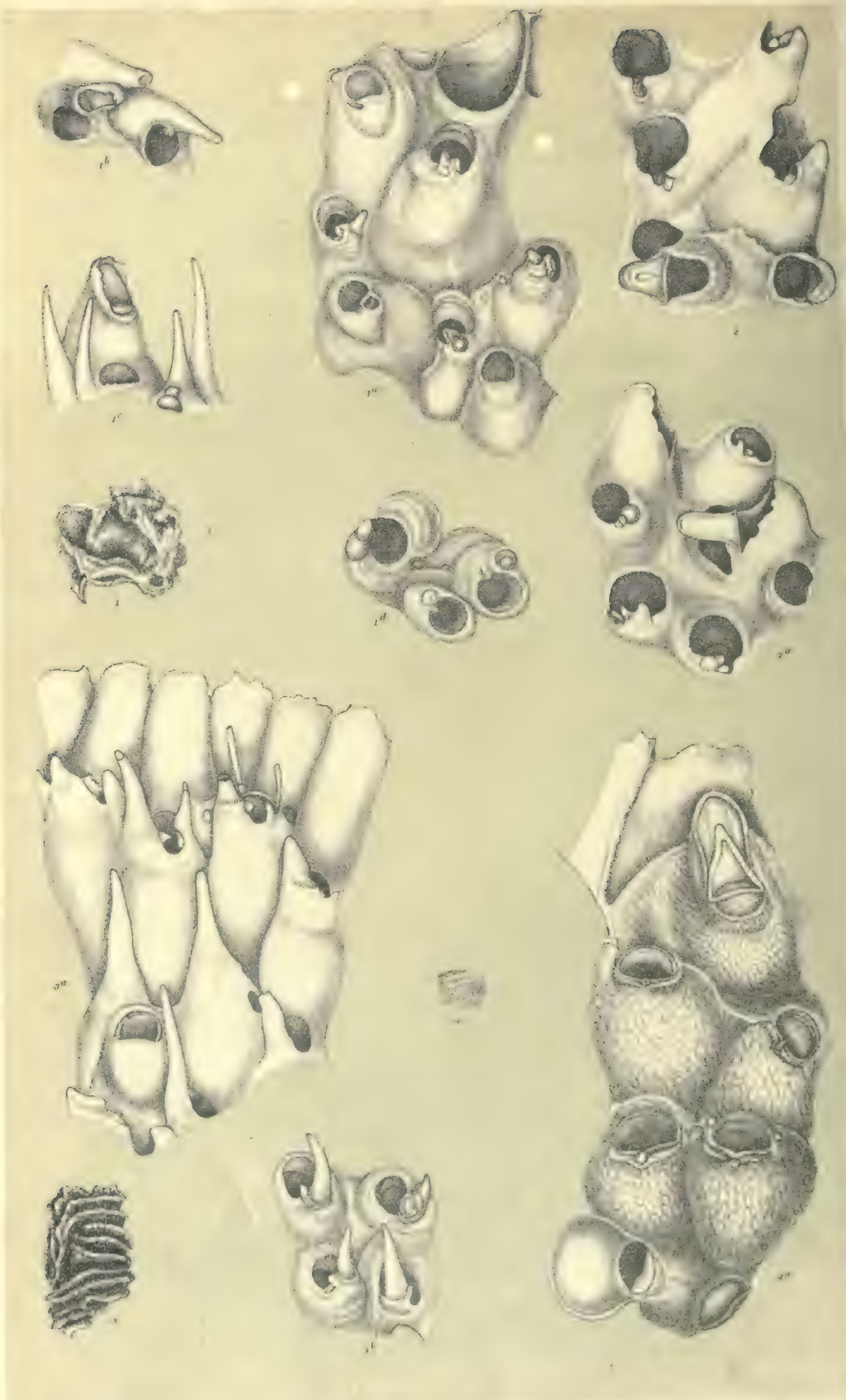


PLATE 167, FIG. 1.

CELLEPORA ALBIROSTRIS (SMITT).

DESCRIPTION.—Zoarium encrusting, or adnate, or partly free, of a white or greyish-brown colour. Marginal zoœcia horizontal, ovate, distinct, smooth ; mouth lofty, arched above, straight below; at first plain, but subsequently a transverse process originating from one side below the mouth, carrying a small avicularium at its inner end, external to which it gives rise to a conical spine which is at first short, but with growth attaining a considerable height, and frequently with the adjacent part of the zoœcium enlarged; older zoœcia more erect and confused, but with the same structure. Oœcia sub-globose. Vicarious avicularia on calcareous elevations, with large, broadly ligulate mandibles closing on serrated beaks.

REFERENCES.—*Discopora albirostris*, Smitt, Floridan Bryozoa, pt. ii., p. 70, pl. xii., figs. 234–239 = *Cellepora albirostris*, Busk, Challenger Polyzoa, pt. i., p. 193, pl. xxxiv., fig. 7, and pl. xxxv., fig. 3.

Port Phillip Heads.

I have considerable doubt whether this is identical with Smitt's and Busk's species. All my specimens are encrusting or fixed to roots of *Laminariæ*. None of them show the two long, slender, rigid, oral spines figured by Smitt and Busk, but the former remarks that they are sometimes wanting. The pre-oral rostra are also thicker. The opercula are usually, as mentioned by these authors, of a dark colour, and contrast strongly with that of the zoarium. The shape, however, differs from Busk's figures.

EXPLANATION OF FIGURES.

PLATE 167.—Fig. 1, specimen, natural size. Fig. 1*a*, zoœcia, from the growing margin, magnified. Fig. 1*b*, two zoœcia and small vicarious avicularium. Fig. 1*c*, vicarious avicularium, mouth of zoœcium, and several pre-oral rostra from others. Fig. 1*d*, zoœcia and oœcium, from central part.

PLATE 168.—Fig. 12, operculum.

PLATE 167, FIG 2.

CELLEPORA FUSCA (BUSK).

DESCRIPTION.—Zoarium, very much lobed, the lobe bilaminate, narrowed at the base and wider above. Marginal zoœcia ovate, distinct, smooth; primary mouth entire, but becoming notched from the growth of a transverse process having a

small avicularium, with a rounded mandible and serrated beak overlooking the notch, and a conical rostrum posteriorly. Vicarious avicularia large, on the side of thick calcareous elevations; mandible large, broadly ligulate, and closing on strongly serrated beaks.

REFERENCE.—Busk, Brit. Mus. Cat., Mar. Pol., pt. ii., p. 88, pl. cxix., fig. 2, and pl. cxx., fig. 6.

Portland, Mr. Maplestone.

The specimen figured forms a laminated mass, $1\frac{1}{4}$ by 2 inches, and is growing on a branch of a slender dark alga.

EXPLANATION OF FIGURES.

PLATE 167.—Fig. 2, portion from the growing edge. Fig. 2*a*, more central portion, showing also two large avicularia.

PLATE 168.—Fig. 16, chitinous parts.

PLATE 167, FIG 3.

CELLEPORA LIRATA (McG.).

DESCRIPTION.—Zoarium flat and adherent, or loosely adnate, or encircling stems of algæ or zoophytes, raised into usually regular sharp ridges, with deep furrows between; the extreme summits of the ridges forming a sort of crimped edge. Zoœcia towards the summits of the ridges elongated; mouth elongated, two spines (usually absent) above, a rostrum on each side, one very large and produced into a long, tapering process, and having towards its base an overhanging avicularium; the other rostrum (frequently absent) smaller, and usually with a similar avicularium; zoœcia in the furrows confused, nearly vertical, thicker, and having usually only one rostrum, with an overhanging avicularium.

Port Phillip Heads.

This species is usually readily distinguished by the manner in which the zoœcia are disposed in sharp ridges, separated by deep furrows. In some specimens, however, especially those not encircling other objects, but flat and adherent or adnate, the ridges are short, interrupted, not so high, and more resembling the elevations of *C. mamillata*. The extreme summits are produced into a thin, frilled, sharp edge, as occurs in *Densipora corrugata*, to which the mode of growth in many specimens is remarkably similar. It is allied to *C. albirostris*.

EXPLANATION OF FIGURES.

PLATE 167.—Fig. 3, specimen, natural size. Fig. 3*a*, side view of the edge of one of the ridges, magnified. Fig. 3*b*, zoœcia, from a furrow.

PLATE 168.—Fig. 14, operculum.

PLATE 167, FIG. 4.

CELLEPORA MAGNIROSTRIS (McG.).

DESCRIPTION.—Zoarium small, encrusting, or partially free. Zoœcia large, ovate, distinct, separated by deep grooves, surface granular; mouth straight or slightly sinuous below; immediately below the lip an irregular thickened band, with a small elevation in the middle (possibly an aborted avicularium); a long, articulated spine (frequently absent) on each side of the mouth. Oœcia globose, smooth. Numerous scattered, vicarious, much raised avicularia, the rostrum with a smooth or serrated margin, and the mandible crossed by a triangular chitinous band.

Port Phillip Heads.

Evidently allied to *C. bispinata*, but differing in the absence of distinct rostrum with avicularium, and the structure of the large vicarious avicularia. In the figured specimen the oœcium is smooth, and surrounded by a distinct rim; in other and probably older specimens there is no rim.

EXPLANATION OF FIGURES.

PLATE 167.—Fig. 4, specimen, natural size. Fig. 4*a*, portion magnified, showing zoœcia, oœcium, and large avicularium. The avicularia are usually broader below the sharper point, so as to have a hastate shape.

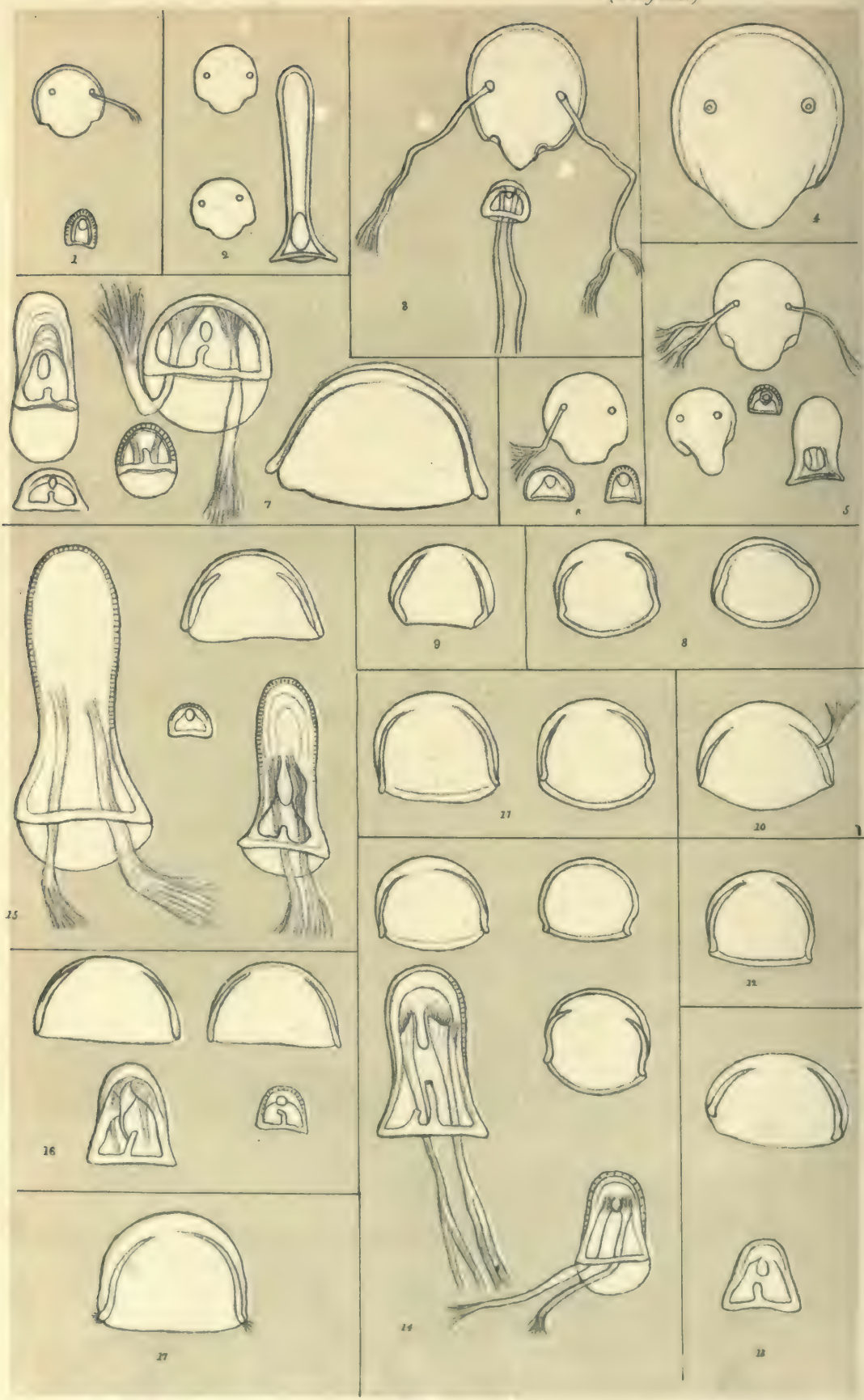
PLATE 168.—Fig. 17, operculum.

My friend Mr. MacGillivray has presented all the type specimens and descriptions of the species of the very important and difficult genus *Cellepora*, represented on plates 165 to 168, and made the drawings for the lithographer, so as to insure the accuracy which can scarcely be got by the aid of the most skilful artist other than the naturalist actually defining the species; and the Museum and this work are very greatly indebted to him for the complete illustrations of those Polyzoa, which could not otherwise have been presented to the public.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Polyzoa)



P. H. Macgillivray del.
J. Ripper lith.

Prof. M.c Coy direxit

Steam Litho. Govt. Printing Office

PLATE 168.

CHITINOUS PARTS OF SPECIES OF CELLEPORA.

FIG. 1, C. GLOMERATA.

2, C. PLATALEA.

3, C. COSTATA.

4, C. MEGASOMA.

5, C. VITREA. (The specimen from which these chitinous parts were taken differs in some respects from that figured.)

6, C. TIARA.

The foregoing species belong to the proposed new genus *Schismopora.*

FIG. 7, C. SIMPLEX.

8, C. SPICATA.

9, C. BISPINATA.

10, C. FOLIATA.

11, C. PROLIFERA.

12, C. ALBIROSTRIS.

13, C. SERRATIROSTRIS.

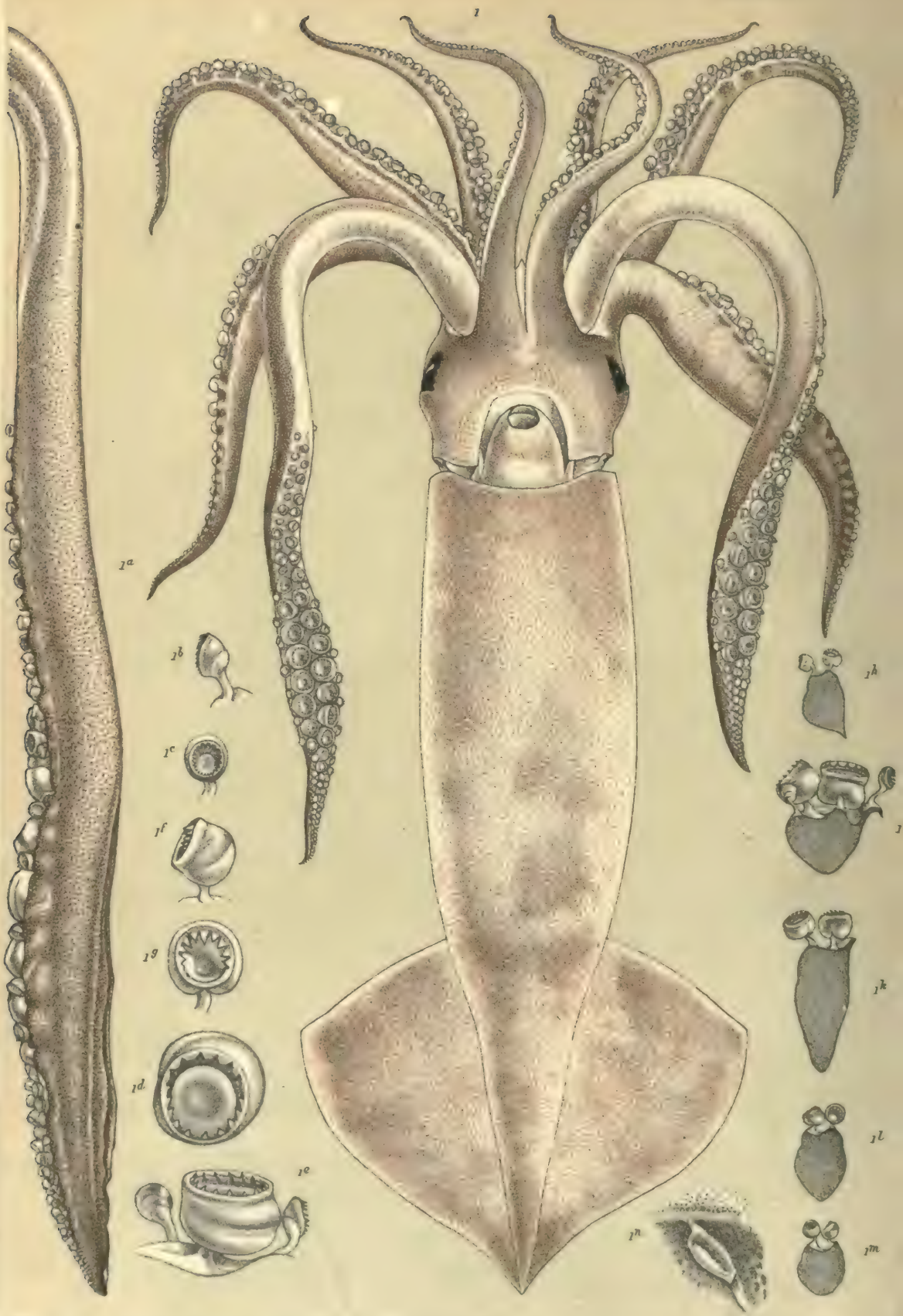
14, C. LIRATA.

15, C. VERRUCOSA.

16, C. FUSCA.

17, C. MAGNIROSTRIS.

(*Mollusca*)



D^r J. J. Wild del. et lith. Prof^r M^c Coy direct Steam Litho Gov^t Printing Office

F. C. J. Wild, del. et lith. Prest. Mc Coy, direct. Stone. Litho. Gov. Printing Office

PLATES 169 AND 170.

OMMASTREPHES GOULDI (McCOY).

GOULD'S SQUID.

[Genus OMMASTREPHES (D'ORB.). (Sub-kingdom Mollusca. Class Cephalopoda. Sub-class Antipedia. Order Sephinia. Family Onychoteuthidæ.)

Gen. Char.—Head short, depressed, cylindrical, suddenly narrowed behind the eyes; eyes large, lateral, without skin covering, with a transversely oval external opening, having a large sinus in upper edge; buccal membrane large, 7-lobed, without suckers. Body elongate, cylindrical, tapering abruptly behind, truncated in front; cartilages on base of siphon contracted, and with a tubercle on each side below, forming a triangle, with a narrow internal cavity above, and a wide transverse one below, into which corresponding hard tubercles from inner sides of mantle fit, and extending into a transverse ridge towards each other; two longitudinal ridges on nape, with concavity between, on a hard oblong plate, fitting into corresponding parts on inside of mantle; three longitudinal keels on each side of narrowed posterior portion of head, one containing the opening of the ear. Two large aquiferous openings, between the 3rd and 4th pair of sessile arms, outside the tentacular long arms; four buccal cavities, two between the 1st and 2nd pair of sessile arms, and two between the 3rd and 4th pairs. Two anal cavities, one on each side of base of siphon. Siphon lodged in hollow in head, with a valve, and supported by four ligaments, two inner ones thin, two outer thicker. Suckers pedunculated, with very oblique, toothed, corneous margins; two rows on sessile arms, with teeth on upper edge, and four rows on distal end of long pair, with teeth all round larger ones. Long tentacular arms not retractile, only moderately dilated towards distal end, with a small membranous crest on midline of back, and a membranous margin outside the four rows of suckers; the two inner rows of suckers very large, two outer rows very small. A connecting membrane between the 3rd and 4th pair of arms only. Fins terminal, rhomboidal. Internal dorsal pen narrow, slightly widened in front, narrowing gradually towards posterior end, which slightly dilates and ends in a simple conical cavity; the margins and midline are thickened ridges.]

DESCRIPTION.—Body long, cylindrical for half its length, or nearly to origin of fin, and thence rapidly and abruptly tapering to posterior end. Fin slightly obtuse; lateral angles 100°, about $\frac{2}{5}$ths the length of body to edge of mantle. Sessile arms, 2nd pair equalling the 3rd, 1st pair equalling the 4th; dorsal and ventral pairs equal, and smaller than the second and third pairs, which are equal to each other; third pair compressed, triangular in section, wider and more compressed than the others, with a membranous border (three lines wide) on ventral edge, and one-half the width on the other edge; the other arms without membranous borders. Suckers in two rows, with 9 to 11 teeth on higher part of oblique edge, lower part of edge smooth. Two tentacular arms as long as body, lanceolate and slightly dilated towards distal end, tapering to extremity, with a prominent membranous keel on back of distal portion; suckers of two large, middle rows, with 15 teeth all round each; small suckers of two outer rows with 20 teeth, smaller on lower edge; apical inch and half with 4 rows of small, sub-equal suckers, then 3 inches on which the 8 suckers of each middle row are very much larger than the rest, and then for 2 inches the suckers are small, sub-equal, and in two rows only. Internal pen as long as mantle, acutely angular (at 50°) at widest anterior end, which, in figured specimen, is 6 lines wide, gradually tapering to 1 line wide at 9 inches from tip; then widening again in middle of

posterior two inches, tapering to posterior end, where sides join to form posterior hollow cone, 6 lines long. A supplementary piece of same consistence as pen, and of the same size and shape at anterior end, is attached to anterior end of pen, gradually tapering thence to a narrow posterior end at 1 in. 9 lines long; mid-rib and lateral ribs as in pen. *Colour*: General line of back pale purplish-red from minute chromatophore spots of two sizes; a narrow, definite, dark-purplish band along middle of whole length of body, a wide triangular patch of same colour on each side of head, the base at edge of eye; and a narrow band of same colour along back of each sessile arm; underside similarly dotted with redder and paler spots; suckers and siphon white. Besides the dots, the whole body gleams with the most beautiful, iridescent, opaline, delicate tints of blue, green, and pink; the same colours being stronger round the eye, the centre of which is dark-brown. *Measurements:* Length from base of sessile arms to posterior tip, 13 ins. Proportional measurements to this, as 100: Width of body at middle, $\frac{23}{100}$; at upper edge of fin, $\frac{19}{100}$; at middle of fin, $\frac{5}{100}$; width from lateral angle of one fin to the other, $\frac{47}{100}$; length of tentacular arms, $\frac{80}{100}$; length of sessile arms, 1st dorsal pair $\frac{42}{100}$, 2nd pair $\frac{50}{100}$, 3rd pair $\frac{48}{100}$ to $\frac{50}{100}$, 4th or ventral pair $\frac{42}{100}$; width of head, $\frac{20}{100}$; greatest longitudinal extent of fin, $\frac{35}{100}$; length of body from edge of mantle to posterior end, $\frac{80}{100}$.

The present species agrees with the *Loligo (Ommastrephes) equipoda* of Rüppel in having the sessile arms of two sizes only, but has larger fins. It nearly resembles the *O. insignis* of Gould in shape, but the relative lengths of the sessile arms distinguish it, as well as the obtuse angles of the fins, &c. I suppose the pen described and figured by Gould for *O. insignis* must be imperfect behind and must have lost its generic cone; also the replacement of the suckers by tubercles on bases of two of the arms in some specimens is, I suppose, accidental. The *O. Sloani* (Gray) is stated to have the sessile arms compressed, the third pair acutely finned, with a narrow-rayed membrane on inner edge only of ventral side; the seventh pair of central series of suckers on tentacular arms largest, in which respect it differs from the present species.

The Cuttlefishes forming the genus *Ommastrephes* are distinguished from the *Loligo*, with which they were formerly confounded, by the eyes not being covered by skin; by the lachrymal sinus in upper edge of eyelid; by the four, instead of six, buccal cavities; the hollow in head for siphon, and its having four, instead of two, suspenders; the tentacular arms not being retractile, &c., and the narrow pen with conical cup at posterior end; the want of suckers on buccal membrane; and the lateral openings on base of siphon. They are all gregarious, inhabiting the mid-ocean, where they form the food of whales, porpoises, albatross, petrels, &c.

EXPLANATION OF FIGURES.

PLATE 169.—Fig. 1, ventral view, half natural size. Fig. 1*a*, one of the long arms, natural size. Fig. 1*b*, smaller external pedunculated cups of outer rows of long arm, magnified two diameters, side view. Fig. 1*c*, ditto, front view. Fig. 1*d*, larger cup of long arm, front view, magnified two diameters. Fig. 1*e*, outer side view of ditto, with two small cups, to show relative size, magnified two diameters. Figs. 1*f* and 1*g*, front and side view of suckers of ordinary arms, magnified two diameters. Fig. 1*h*, section of one of ventral pair of arms, about middle, natural size. Fig. 1*i*, section of club of long arms, natural size. Fig. 1*k*, section of broad arms, natural size. Fig. 1*l*, section of next pair, from near middle, natural size. Fig. 1*m*, section of middle of dorsal pair, natural size. Fig. 1*n*, ear, magnified two diameters.

PLATE 170.—Fig. 1, dorsal view, half natural size. Fig. 1*a*, mouth, half natural size. Fig. 1*b*, siphonal tube with valve, seen from above, half natural size. Fig. 1*c*, ditto, side view, showing ligament and button. Fig. 1*d*, dorsal fastening, natural size. Fig. 1*e*, eye, natural size. Fig. 1*f*, pen, half natural size. Fig. 1*g*, ditto, posterior cone, natural size. Fig. 1*h*, ditto, side view. Fig. 1*i*, piece opposed to upper end of pen, half natural size.

FREDERICK MCCOY.

PLATE 171.

CYCLODUS OCCIPITALIS (PETERS).

THE BROAD-BANDED OR OCCIPITAL BLUE-TONGUE LIZARD.

[Genus CYCLODUS (WAGLER). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Scincidæ.)

Gen. Char.—Form moderately thick, elongate, fusiform. Head large, thick, sub-trigonal, obtusely pointed in front. Neck short, thick. Head shields thick, rather rugose; nasal plates near the tip of snout, touching (or nearly) each other above, ovato-trigonal; nostril in centre of nasal plate, with a curved furrow bordering its posterior edge; internasal or prefrontal plate rhombic; no supranasals; frontonasals two, moderate, touching; frontal large, broad, obtuse-angled in front, narrow behind; two moderately large fronto-parietal plates; parietals large; interparietal resembling the frontal, and nearly as long, but much narrower, acute-angled in front; four superciliary plates over each eye, the second largest; about five rows of temporal plates between the eye and the ear; polygonal occipital shields in one or more transverse rows; orbit surrounded by a row of small plates; two or more frenal plates between the nasal plate and the orbit; lower eyelid scaly. Ear-opening large. Scales of back and sides bony, large, convex, subhexagonal, rugose, with obscure, diverging grooves; scales of belly thinner and smoother. Legs four, nearly equal, small, short, strong; feet small, each with five, short, cylindrical, subequal toes; subdigital plates undivided; claws short, thick. Tail short, slightly less than half of the total length, subcylindrical, very slightly compressed laterally, tapering, with rather thicker scales than the back of the body, and a central row of large, broad scales below. Tongue short, flat, scaly, slightly notched at the point. Teeth on edge of jaws, bluntly rounded; palate without teeth, with a triangular notch behind, extending forwards as far as middle of eye; palatine bones meeting in midline of palate.]

DESCRIPTION.—Head acutely angular, tip of snout obtusely rounded. *Cephalic plates:* Rostral hexagonal, separating nasals above, touching the heptagonal internasal or prefrontal (which does not touch the frontal, being separated from it by the junction of the two large frontonasals, which join by their inner edge), by anterior edge, second frenal plate by outer edge, first supraciliary by hind external edge, and frontal by hind internal edge; five superciliary plates, two middle ones narrowest and over eye; two large supra-ocular plates, anterior largest, subtrigonal or pentagonal, touching first three superciliary plates by outer edges, second supra-ocular and frontonasal by middle and inner hind edges, and frontal by inner edge; some specimens have a very small third supra-ocular wedged between the third and fourth superciliary plates, the second supra-ocular, and the parietal; hinder supra-ocular touches third and fourth superciliaries by outer edges, parietals by hind edge, and frontoparietals by inner edge: frontal large, tetragonal, width between anterior lateral angles equal to length from its anterior angle to anterior edge of internasal or prefrontal; length varying from equal to length from anterior angle to tip of snout at middle of rostral, to from same point to anterior edge of internasal; long lateral sides converging to posterior angle between the fronto-parietals; frontoparietals small, subquadrate or pentagonal, touching each other in midline, frontal with inner anterior edge, anterior supra-ocular with anterior outer edge, posterior supra-ocular with posterior outer edge, interparietal with inner posterior edge, and parietal with outer posterior edge; parietals large, much longer and wider than frontoparietals; interparietal narrow, hexagonal, pointed behind (so that there is no azygous occipital plate); three or four transverse rows of pairs of occipital plates behind the interparietal, the first being

about four-fifths the length of the interparietal, the anterior temporals only slightly smaller than the second row; earopening with three or four large lobe scales projecting from anterior margin. Scales subhexagonal, or with posterior edge rounded on belly, smooth below, nearly smooth on back, in some specimens distinctly marked with from three to eight irregular longitudinal ridges, which are either straight and simple, or branching and anastomosing; forty round middle of body, those of the sides slightly smaller than those of the back and belly: ten supralabial plates, the fifth larger than the fourth or sixth, ninth very large: infralabials, eleven; chin plate transversely oblong, twice as wide as deep, width equalling three succeeding infralabials; three large lateral gular plates on each side, with one azygous gular behind the chin plate in front. *Colour:* Above light brown, with four or five, broad, transverse, blackish-brown bands, nine or ten scales wide (in some specimens these transverse bands are broken up irregularly by some lighter scales), with narrower, lighter intervals between, five or six scales wide, and three or four dark bands on tail, separated by slightly wider light spaces; top of the head dark brown, with a broad, brownish-black, ovate patch, extending from eye to upper part of ear; limbs and under-side of throat, belly and tail brownish-white, the distal part of limbs darker above; rough warty plates of soles of the feet and transverse subdigital plates brownish-black; iris dark brown; tongue bright Prussian blue; interior of mouth pink.

MEASUREMENTS.

	Ft.	ins.	lines.
Total length of average specimen	1	4	6
Length of head from snout to anterior edge of ear	0	2	0
Width of head	0	1	9
Length of internasal plate	0	0	4½
Width of „ „	0	0	5
Length of frontal plate	0	0	6
Greatest width of frontal plate	0	0	5
Length of interparietal	0	0	5
Greatest width of interparietal	0	0	2
Length of middle pair of first row of occipitals	0	0	4
Length of second „ „ „	0	0	3
Length of third „ „ „	0	0	2½
Height of rostral plate	0	0	2½
Diameter of ear	0	0	4
From tip of snout to anterior edge of shoulder	0	3	4
Length of anterior limb to tip of longest claw	0	2	1
„ of longest toe and claw	0	0	4
„ from anterior edge of shoulder to anterior edge of thigh	0	6	10
„ of hind limb to extremity of longest claw	0	2	2
„ of tail	0	5	4
Girth round middle of body	0	5	9

Six transverse and seven longitudinal rows of scales in space of one inch on middle of back.

REFERENCE.—Peters, Monatsberichte, Berlin Akad., 1863, p. 231 = *C. fasciatus*, Lütken Vidensk. Meddel, 1862, p. 292, t. 1, f. 1.

This species is readily distinguished from the other two of the genus (figured in our plates 73 and 131) by the great number and size of the rows of occipital plates behind the inter-parietal. The head is also more pointed, and the colouring, which more nearly resembles that of *C. gigas* than *C. nigroluteus*, is distinguished by the smaller number and greater width of the transverse bands

marking the upper surface. This species is very rare in Victoria, only one or two specimens having been seen in the Western District, near Horsham ; it is, however, more common in South and West Australia. The specimen figured was presented to the Museum by Mr. Le Suoef, who had it alive in the Zoological Gardens in the Royal Park.

EXPLANATION OF FIGURES.

PLATE 171.—Fig. 1, average specimen, two-thirds the natural size. Fig. 1*a*, top view of head, showing three rows of pairs of large occipital plates behind interparietal, natural size. Fig. 1*b*, under view of head, showing chin and infralabial plates, with large median and lateral gular plates below them. Fig. 1*c*, side view of head, showing labial plates and temporal plates of specimen with four lobed scales in front of ear. Fig. 1*d*, eye, showing surrounding scaly plates and five superciliary plates, magnified. Fig. 1*e*, front view, showing rostral and chin plates. Fig. 1*f*, magnified view of infralabial and gular plates. Fig. 1*g*, nasal plate pierced by nostril, with curved sulcus behind, magnified. Fig. 1*h*, scales of belly, magnified. Fig. 1*i*, scales of back, magnified. Fig. 1*k*, hind foot, showing tuberculated sole and transverse infradigital plates, magnified. Fig. 1*l*, same view of anterior foot, magnified.

FREDERICK MCCOY.

A. Bartholomew del. et lith. Prof. McCoy auxt. Steam. Litho. Govt. Printing Office

PLATE 172.

SERIOLA LALANDI (CUV. AND VAL.).

THE YELLOW-TAIL.

[Genus SERIOLA (CUV.) (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostei. Order Acanthopterygii. Family Carangidæ.)

Gen. Char.—Body oblong, elongate, ovate, moderately compressed; profile of head moderately convex, slightly convex thence to origin of second dorsal, nearly straight thence to depression near base of caudal; profile of belly gently convex to origin of anal, nearly straight thence to a slight depression near origin of caudal; abdomen rounded, not sharp-edged. Scales very small, irregularly arranged. Cleft of the mouth moderate. First dorsal with small spines connected by membrane, nearly joining the very long falcate second dorsal; anal falcate, with two small spines, separate from the others in front; no finlets behind dorsal nor anal; caudal large, forked; pectoral and thoracic ventrals moderate. Lateral line undulated in anterior half, straight on posterior half, not armed by peculiar scales. Preoperculum very finely serrated by minute radiating striæ. Teeth forming broad, villiform bands on the jaws, the vomer and the palatine bones. Branchiostegal rays seven. Air-bladder large. Pyloric appendages many. Tropical and temperate seas.]

D. 7·1/34; A. 2·1/21; C. $\frac{4+12}{5+13}$; P. 20; V. 1. 5; L. lat. $203\frac{2}{4}\frac{8}{5}$.

DESCRIPTION.—Body elongate, ovate, greatest depth at origin of second dorsal, about equal to from snout to middle of base of pectoral; about $4\frac{1}{3}$ times in total length to end of caudal fin; snout about twice the diameter of the eye in length; maxillary very broad, as wide as diameter of eye behind, with supplementary bone above, reaching a little beyond anterior margin of orbit; ventrals $2\frac{1}{2}$ in distance between their origin and origin of anal. *Teeth:* A broad band of minute villiform teeth on each jaw; a broad, ovate patch on each palatine, behind which are larger groups of small clusters of minute teeth; vomer with a large patch, broad and rhombic in front, with a narrow posterior prolongation; a large rhomboidal patch on tongue, with numerous small clusters on sides. *Scales:* Very small, rounded, irregularly arranged; with an imperfect fan of few rays behind, and the concentric lines of growth slightly undulated, but not enough to serrate the posterior edge; those on cheeks about the same size as those on body; those of tubular lateral line narrow, elongate, oblong. The posterior and inferior edges of the preoperculum marked with very fine, radiating striæ, about 14 in three lines, giving a very minute, almost imperceptible serration to the edge (too coarse in our plate). Lateral line slightly and irregularly undulated to vertical of origin of anal, thence straight to middle of tail, raised into a distinct keel on the middle of pedicle. *Fins:* Spines of anterior dorsal thick but short, first spine one-third the length of the second; second dorsal falcate, the first ray simple, less than half the length of the second, all the rest largely branched; the second, third and fourth longest, rapidly diminishing to the fourteenth, after which they are nearly equal to the last two, which are larger than the preceding ones. Anal: The two short anterior spines, without membrane, are about the length of the second one, distant from the rest of the anal fin; first spine of continuous anal about one-third the length of the succeeding branched ray, which is longest; the length rapidly diminishing to the eighth, after which the length is nearly uniform to the last two, which are longer. Caudal large, deeply forked, the middle nearly straight. Pectoral and ventral fins moderately pointed.

MEASUREMENTS.

	Ft.	ins.	lines.
Total length from tip of snout to end of upper lobe of caudal, of small specimen	2	6	0
" " " anterior edge of orbit	0	2	6
" " " posterior edge of orbit	0	3	5
" " " end of maxillary	0	2	8
" " " edge of operculum	0	5	3
" " " base of pectoral	0	5	10
" " " first dorsal spine	0	8	9
" " " first branched ray of dorsal	1	0	6
" " " base of last ray of dorsal	1	11	3
" " " base of ventral	0	7	6
" " " first spine of anal	1	4	0
" " " last ray of anal	1	11	0
" " " origin of caudal	2	2	6
Greatest length of pectoral	0	3	0
" " ventral	0	3	4
Height of first dorsal spine	0	0	3
" second dorsal spine	0	0	9
" first branched ray	0	3	0
" twelfth branched ray	0	0	10
" first anal spine	0	0	1
" second anal spine	0	0	2
" third anal spine	0	0	10
" first branched ray	0	2	4
" eighth branched ray	0	0	10
Length of lobes of caudal	0	4	7
Depth of head	0	5	0
Greatest depth of body, opposite origin of branched dorsal	0	6	9
Space between eyes	0	2	2
Diameter of orbit	0	0	11

Seven or eight scales in six lines about middle of body.

Colour: Caudal fin bright gamboge yellow, with darker base and narrow whitish posterior edge. Dorsal fin yellowish-olive, with brighter yellowish edge. Ventral and anal with pale purplish membrane, yellow rays and narrow whitish tips. Pectoral very pale yellowish, purplish at the base. A dull yellowish bronze band, about the width of the eye, extends from posterior edge of eye to upper half of base of tail, a little wider about middle of body, where its lower edge is slightly above the middle of the depth; back and sides, above yellowish band, dark purplish blue, darkest and with an olive tint on top of head, gradually becoming lighter over cheeks to throat; lips dull yellowish; sides, below yellowish band, and the belly pale purplish pearly white. Iris yellow.

REFERENCE.—Cuv. and Val., Hist. Nat. des Poiss., v. 9, p. 208 = *S. aureo-vittata*, Schlegel, F. Jap. Poiss., t. 62, f. 1 = *S. grandis*, Cast., Proc. Zool. Soc. Vict., v. 1, p. 115.

There can be no doubt that this fish, so very conspicuous by its size and colouring in the fish shops in summer, is perfectly identical with Schlegel's Japan *Seriola aureo-vittata*, and I should have preferred to use this name if Dr. Günther had not satisfied himself that it was a synonym of Cuvier and Valencienne's Brazilian *S. Lalandi*, which he traced by specimens across the Atlantic at St. Helena and the Cape of Good Hope. It is certain also that Count Castlenau's *S. grandis* of the Melbourne fish shops is the

same species, the difference he gives in number of the rays of the dorsal and anal fins being simply inexplicable. The numbers of the fin rays and spines, as I give them, have been tested on great numbers of specimens. The bright yellow of the tail, as in our figure, is generally very conspicuous, and as I give it; but in many specimens the base is of a darker brownish hue, and sometimes, although rarely, the fin assumes a brownish olive tint. The bright gamboge yellow is, however, the striking, usual, characteristic colour. The yellow band passing through the eye along the sides to the tail, although generally very conspicuous, is occasionally duller or more obscure in some specimens. About three feet long is the average size; but specimens occasionally occur four feet in length, and I have heard of some weighing 90lbs. The air bladder is large, with two small lateral lobes in front.

EXPLANATION OF FIGURES.

PLATE 172.—Fig. 1, average specimen, one-fourth the natural size. Fig. 1*a*, head (striation and serration of preoperculum much too coarse). Fig. 1*b*, teeth of jaws, vomer and palatine, three-fifths the natural size. Fig. 1*c*, teeth on upper jaw and tongue. Fig. 1*d*, scale of sides, magnified four diameters (the concentric lines and margin on the posterior portion should be slightly more undulated). Fig. 1*e*, scale from lateral line, magnified four diameters. Fig. 1*f*, section of pedicle of tail, to show the keels.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Fishes)

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ZOOLOGY OF VICTORIA

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PLATES 173 AND 174.

CHILODACTYLUS CARPONEMUS (CUV. AND VAL.).

THE LONG-FINGERED CHILODACTYLUS.

[Genus CHILODACTYLUS (Cuv.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Family Cirrhitidæ).

Gen. Char.—Oval, compressed; mouth small. One dorsal fin, with 16 to 10 spines; anal fin of moderate length; ventrals under about the middle of pectorals; caudal forked; lower rays of pectoral unbranched, one or more prolonged beyond the membrane. Teeth in villiform bands on the jaws, outer row largest, but no canines; no teeth on the vomer or palatine bones. Preorbital and preoperculum entire. Scales of moderate size, cycloid. Cheeks and opercular pieces scaly. Five or six branchiostegal rays. Air-bladder usually with many lobes. Temperate regions of Pacific and Indian Oceans.]

B. 6*; D. 17 + 32†; C. 17; A. 3 + 19; V. 1 + 5; P. 15; L. l. 66$\frac{10}{19}$.

DESCRIPTION.—Ovate, dorsal and ventral lines moderately convex, tapering rapidly to near base of tail; seven lower rays of pectoral simple, also the upper two; sixth pectoral ray from bottom longest, reaching horizontally to posterior edge of row of scales running to eleventh ray of anal; fifth ray from bottom also elongate, but not reaching beyond the row of scales which forms anterior side of anus. Length of head $4\frac{1}{2}$ in total length including lower lobe of caudal; greatest depth $3\frac{1}{3}$ in same total length. Diameter of eye half the length of snout, $4\frac{1}{2}$ in length of head. Outer row of teeth strong and blunt, inner rows more slender and arched. Fifth and sixth dorsal rays longest; first dorsal moderately arched, outline only slightly rising to second dorsal, the rays of which are more nearly equal. First ray of anal half the length of second or third; all of them rather slender, second thickest. Scales on plates of head small, about three rows of very small scales on edges of channel into which the dorsal fins may be depressed. *Colour:* Bluish slate grey, fading to white on lower edge of jaw and belly, and brighter blue on top of head and snout. Numerous narrow, flexuous, bright yellow lines radiate from the upper three-fourths of the orbit, branching as they pass over the front; three of the branches running as narrow yellow lines below the base of dorsal. All the fin rays of the slate colour of the body, those of the pectoral palest, nearly white, and the branched rays of the dorsal with three rows of yellow spots; membrane greyish, almost colourless, except the caudal, which is nearly as dark as the body. Iris orange-yellow; lips pink. *Measurements:* Length from tip of snout to base of caudal, 2 ft. 4 ins. Proportional measurements to length of body, as 100: Tip of snout to edge of operculum, $\frac{25}{100}$; to anterior edge of orbit, $\frac{12}{100}$; diameter of orbit, $\frac{4\frac{1}{2}}{100}$; longest (third) branched ray of pectoral, $\frac{21}{100}$; longest simple ray of pectoral, $\frac{40}{100}$; next below, $\frac{23}{100}$; next below, $\frac{15}{100}$; greatest length of ventral, $\frac{14}{100}$; greatest height of spinous dorsal, $\frac{7}{100}$; greatest height of branched dorsal, $\frac{4}{100}$; length of upper lobe of caudal, $\frac{17}{100}$; lower lobe of caudal, $\frac{20}{100}$; depth of body, $\frac{38}{100}$. (I think the shortness of the upper lobe of the tail in this specimen, the figured one, must be an accidental individual peculiarity).

REFERENCE.—Hist. Poiss., v. 5, p. 362, t. 128.

* Five long and a short anterior one. † Last two with one base.

This large and beautiful food-fish has not been figured of the colours of life before, and I find the markings variable in different individuals ; they disappear in spirit and stuffed specimens completely.

Rare in Hobson's Bay or at the Heads ; the specimen figured was caught in July, 1874.

EXPLANATION OF FIGURES.

PLATE 173.—Fig. 1, specimen, with lineated back, and with probably injured upper lobe of tail, about one-third of natural size. Fig. 1*a*, teeth of upper jaw, natural size. Fig. 1*b*, teeth of lower jaw, natural size. Fig. 1*c*, scale from middle of body, twice the natural size. Fig. 1*d*, scale from lateral line, twice the natural size. Fig. 1*e*, form of section of middle of body. Fig. 1*f*, section of pedicle of tail.

PLATE 174.

CHILODACTYLUS CARPONEMUS (CUV. AND VAL.) VAR.

D. 17 + 32; P. 15; V. 1 + 5; A. 3 + 18; C. $\frac{10}{9}$; L. l. $62\frac{8}{18}$ (5 large, 3 small).

DESCRIPTION.—Sixth pectoral ray from bottom reaching horizontally to posterior edge of row of scales running to eighth ray of anal. First anal spine about half the length of the second, which is considerably thicker; third spine about as long as the second. *Colour:* Cheeks and sides of upper half of back pale purplish-grey, with yellowish-brown bronze reflections, and with the edges of the scales bright blue, fading to white on lower half of body and belly. Front of head from snout to dorsal fin bright ultramarine blue and rich opaline purple, with numerous greenish-yellow undulating bands radiating in pairs from upper three-fourths of eye, widening as they cross over the front; hinder ones only reaching edge of preoperculum (in another specimen they reach to edge of operculum), interrupted between the eyes. Middle of cheeks greenish; throat purplish; lower portion of opercular pieces and chin whitish; fin rays blue, those of the branched dorsal with two rows of yellow spots. Membrane of spinous dorsal, pectoral, and ventral, pale-purplish, nearly colourless. Membrane of branched dorsal, and anal, pale-greenish, obscurely clouded with blue, orange, and yellow; rays blue; a bright blue band at base on both rays and membrane; a pair of broad yellow lines (united posteriorly) run along base of branched dorsal. Membrane of caudal yellowish-olive, the upper and lower rays bright blue, a duller blue on middle rays and narrow posterior edge. Iris yellow. Lips pink; inside of mouth black. *Measurements:* Length from tip of snout to base of caudal, 2 ft. 2½ ins. Proportional measurements to length of body, as 100: Tip of snout to edge of operculum, $\frac{26}{100}$; to anterior edge of orbit, $\frac{13}{100}$; diameter of orbit, $\frac{5}{100}$; longest (third) branched ray of pectoral, $\frac{20}{100}$; longest simple ray of pectoral, $\frac{41}{100}$; next ditto, $\frac{20}{100}$; next below, $\frac{16}{100}$; greatest length of ventral, $\frac{15}{100}$; greatest height of spinous dorsal, $\frac{8}{100}$; greatest height of branched dorsal, $\frac{15}{100}$; length of upper lobe of caudal, $\frac{21}{100}$; lower lobe of caudal, $\frac{20}{100}$; depth of body, $\frac{37}{100}$.

I believe the fish figured on this plate to be only a variety of that represented on Plate 173. The specimen figured was caught at Port Phillip Heads in December, 1884.

EXPLANATION OF FIGURES.

PLATE 174.—Fig. 1, specimen, with plain back, and form of perfect caudal, about one-third the natural size. Fig. 1*a*, top of head to show pattern of the lineations. Fig. 1*b*, teeth of upper and lower jaws. Fig. 1*c*, scale from below lateral line, magnified two diameters. Fig. 1*d*, tubular scale from lateral line, magnified two diameters. Fig. 1*e*, scale from above lateral line, magnified two diameters.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Polyzoa)

F. H. Macgillivray del.
J. Ripper lith.

Prof. M^c Coy direxit.

Steam litho. Govt. Printing Office

PLATE 175, FIG. 1.

TESSARADOMA MAGNIROSTRIS (McG.).

[Genus TESSARADOMA (NORMAN). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Microporellidæ.)
Gen. Char.—Zoarium encrusting, or foliaceous and unilaminate, or erect and ramose. Zoœcium with the peristome produced and turned forwards in a tubular or subtubular manner; a median, tubular, zoœcial pore.]

DESCRIPTION.—Zoarium hemescharine, large, thick. Zoœcia large, indistinct, smooth when the thick epitheca is entire, with large perforations when this is removed; zoœcial pore rounded, elevated, between the mouth and the middle of the zoœcium; mouth large, nearly straight below, arched above, peristome raised. On each side of the zoœcium, below the mouth, a large avicularium with the long, pointed mandible directed transversely outwards.

REFERENCES.—*Lepralia magnirostris*, P. H. MacGillivray, Tr. Roy. Soc. Vict., July, 1882; *Porina magnirostris*, Hincks, Ann. and Mag. Nat. Hist., October, 1884.

Port Phillip Heads.

Forms a thick hemescharine zoarium, the layers being occasionally folded and united back to back. The zoœcia are large and very indistinct. The whole surface is covered by a thick epitheca on which the only mark seen is the tubular opening of the zoœcial pore. When the epitheca is removed, the surface is seen to be covered with large perforations. In old specimens these may be filled in, or even become tubercular from the heaping up of calcareous matter. I have not seen oœcia.

I have elsewhere shown that the name *Porina*, originally proposed by D'Orbigny (Paléontologie Française, v. 432) to include, amongst living forms, *P. Africana* (D'Orb.) and *Eschara gracilis* (Milne-Edwards), ought to be retained for those agreeing with Milne-Edwards' species in the possession of an external or adventitious pore formed by the growth of the peristome and, therefore, opening externally to the true mouth. *Tessaradoma*, proposed by Norman for another species previously described by Busk as *Onchopora borealis* and by Sars as *Quadricellaria*, clearly

belongs to those species agreeing with his type and the present in having, among other characters, a true zoœcial pore.

EXPLANATION OF FIGURES.

PLATE 175.—Fig. 1, specimen, natural size. Fig. 1*a*, two zoœcia covered by the epitheca. Fig. 1*b*, zoœcium denuded of the epitheca.

PLATE 175, FIGS. 2, 3, 4, 5.

MICROPORELLA DIADEMA (McG.).

VARIETIES LUNIPUNCTA, LONGISPINA, LATA, AND CANALICULATA.

[Genus MICROPORELLA (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Microporellidæ.)
Gen. Char.—Mouth arched above, straight below, peristome not raised; a single zoœcial pore or a perforated plate below the mouth. Oœcia external.]

The ordinary form of this common and beautiful species has been already figured in Plate 37, fig. 6, and described. It is subject to considerable variation, principally in the markings of the surface, the size and form of the zoœcial pore, as well as the spines and oœcium. *Lepralia lunata* (Plate 36, fig. 8) is also referable to the same species. Mr. Waters considers *M. diadema* as a form of the fossil *Eschara decorata* of Reuss, a determination with which I cannot agree.

The following varieties are worthy of distinction:—

Variety *lunipuncta* (McG.). Zoœcia broad, smooth and slightly grooved at the edge. Zoœcial pore a narrow lunate slit, equalling the mouth in width. Avicularia large, below the pore, with the mandible pointed upwards and outwards. Tr. Roy. Soc. Vict., Nov. 1884.

Variety *longispina* (McG.). Zoœcia broad, slightly calcareous, grooved at the edges; oral spines large, long, the lower on one or both sides of enormous length, antenniform, and articulated outside the peristome. Zoœcial pore round, oval or semicircular, of moderate or rather small size. Avicularia opposite the pore, pointing downwards and outwards. Tr. Roy. Soc. Vict., Nov. 1884.

Variety *lata* (McG.). Zoœcia broad, flat, smooth except faint grooving at the edges. Zoœcial pore of moderate size, semilunar. Avicularia generally situated above the level of the pore, sometimes by the side of the mouth, the long slender mandible mostly directed downwards. Tr. Roy. Soc. Vict., Nov. 1884.

Variety *canaliculata* (McG.). Zoœcia very calcareous, edges deeply grooved, the intervening divisions and margins very calcareous; the grooves converging towards the central part, which is marked off by a heaped-up calcareous ridge. Zoœcial pore of moderate size, circular. Avicularia large, usually on one side only of the pore, with the mandible directed outwards. In the oœcia the band is smooth and a series of deep grooves, separated by calcareous ridges, converge to the centre, which is raised. In young specimens, the deposition of calcareous matter is very much smaller and the markings proportionately less distinct, but the form as figured is very soon assumed. It is that which I previously described as *Lepralia canaliculata* (Plate 37, fig. 4), but an examination of numerous specimens has satisfied me that, however distinct in appearance at first sight, it ought properly to be ranked merely as a variety of *M. diadema*. Tr. Roy. Soc. Vict., Nov. 1884.

EXPLANATION OF FIGURES.

PLATE 175.—Fig. 2, *Microporella diadema*, variety *lunipuncta*. Fig. 3, variety *longispina*. Fig. 4, variety *lata*. Fig. 5, variety *canaliculata*.

PLATE 175, FIG. 6.

MICROPORELLA RENIPUNCTA (McG.).

DESCRIPTION.—Zoœcia ovate, distinct, smooth or faintly areolated at the margins; mouth straight below, arched above, with three or four spines; a large, reniform, punctate plate, covering a zoœcial pore below the mouth. An avicularium, with sharp pointed mandible, situated transversely between the pore and the mouth. Oœcia large, prominent, traversed by a thickened ridge separating an inferior area which is smooth or marked with radiating lines.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July, 1882.

Port Phillip Heads.

Readily distinguished by the reniform, usually bulging plate covering the zoœcial pore, the transverse avicularium (occasionally wanting), and the structure of the zoœcium. In a variety of *M. ciliata* from California the round zoœcial pore is closed by a finely cribriform plate.

EXPLANATION OF FIGURE.

PLATE 175.—Fig 6, portion of specimen, magnified.

PLATE 175, FIG. 7.

MICROPORELLA SCANDENS (McG.).

DESCRIPTION.—Zoœcia pyriform, smooth; mouth straight below, arched above; four or six long, articulated oral spines; zoœcial pore small and lunate. Oœcia large, rounded, upper edge, where adpressed to the zoœcium above, slightly dentate.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1884.

Port Phillip Heads.

I have only seen a single small specimen, consisting of a chain of eight zoœcia, four surmounted by oœcia, running up a twig of *Bicellaria grandis*. The habit of growth is not likely to be constant, but it seems to be a distinct species from any other described form.

EXPLANATION OF FIGURE.

PLATE 175.—Fig. 7, portion of specimen, magnified.

PLATE 175, FIGS. 8 AND 9.

MICROPORELLA CILIATA (LINN. SP.).

VARIETIES SPICATA AND PERSONATA.

The cosmopolitan *Microporella ciliata*, already figured in Plate 37, fig. 1, is a very variable species, but can always be distinguished by the form of the mouth, the suboral pore, and lateral avicularia. These last vary much. In Australian specimens

they have usually the rostrum very small, and a very long, vibraculoid, setiform mandible, but in others the avicularium is large, the mandible being broad, short and triangular.

The following varieties are figured :—

Variety *spicata* (McG.). Zoœcia finely granular, a stout conical process from the front of the zoœcium, below the pore which it conceals, directed upwards; avicularium with long vibraculoid mandible. Oœcia prominent, granular. This resembles a figure given by Hincks as var. *Californica*, but Busk (Q. J. Mic. Sc., iv. 310) does not describe the peculiar process in his *L. californica* which undoubtedly is also a variety of M. *ciliata*.

Variety *personata* (Busk). An extension of the sides of the oœcium across the lower lip of the fertile zoœcia. The zoœcial pore seems to be sometimes external to this hood or pouch and sometimes enclosed within it. Avicularian mandible long and vibraculoid. It has been described by Busk (Brit. Mus. Cat., Mar. Pol., pt. ii., p. 74, pl. xc., figs. 2, 3, 4; and *Challenger* Pol., pt. i., p. 137) as a distinct species, in consequence of the peculiar growth of the oœcium, a structure which occurs in several other species, not only of this genus. Hincks has rightly (Brit. Mar. Pol.) described it as a variety.

EXPLANATION OF FIGURES.

PLATE 175.—Fig. 8, *Microporella ciliata*, variety *spicata*. Fig. 9, variety *personata*.

PLATE 175, FIGS. 10 AND 11.

MICROPORELLA MALUSII (AUDOUIN SP.).

VARIETIES PERSONATA AND THYREOPHORA.

This species has been already figured (Pl. 36, fig. 7) and described, but the following varieties require notice :—

Variety *personata* (McG.). Zoœcia elongated, smooth, with very few stellate puncta; zoœcial pore large, transverse. Oœcia

large, granular, with a hooded extension across lower lip of fertile zoœcium, the lower part frequently obscuring the pore which is external to it.

Variety *thyreophora* (Busk). Zoœcium with a scutiform area of variable size marked off in front, usually a row of stellate puncta on each side of this area and a transverse row immediately below the lower lip; occasionally a double row on each side of the area; the lower part of the zoœcium without puncta. Oœcia usually large and entire, but at other times of moderate size and dentate, as in the figure. It is described as a distinct species by Busk (Quart. Journ. Mic. Science, v. 172, pl. xv., figs. 4, 5) and as a variety by Hincks (Brit. Mar. Pol., p. 212).

EXPLANATION OF FIGURES.

PLATE 175.—Fig. 10, *Microporella Malusii*, variety *personata*. Fig. 11, variety *thyreophora*.

PLATE 175, FIG. 12.

ESCHARIPORA STELLATA (SMITT).

[Genus ESCHARIPORA (SMITT). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Microporellidæ.)

Gen. Char.—Zoarium encrusting. Mouth arched above, straight below; several stellate zoœcial pores on the front of the zoœcia. Avicularian mandibles without projecting articular processes.]

DESCRIPTION.—Zoarium encrusting. Zoœcia distinct, broadly oval; surface with numerous stellate zoœcial pores; mouth nearly straight below, thickened and arched above. A sessile avicularium at each angle of the mouth, the mandible directed upwards and inwards; usually a third avicularium above the mouth with the mandible directed downwards.

REFERENCES.—*Escharipora stellata*, Smitt, Floridan Bryozoa, pt. ii., p. 26., pl. vi., fig. 130–133; *Microporella stellata*, P. H. MacGillivray, Tr. Roy. Soc. Vict., July, 1882.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

Forms very pretty silvery zoaria. The pores in young specimens pierce the centres of thin rounded eminences. As age advances the pores become depressed owing to the deposition of calcareous matter between them. The supra-oral avicularium is not always present. I have not seen oœcia.

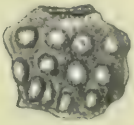
Smitt first proposed the genus *Escharipora* for species of *Cribrilina* (Gray) which he again referred back to that genus in the Floridan Bryozoa. He there retains *Escharipora* for the present and another species, *E. mucronata*, which he doubtfully places with it, referring also to the same genus *Eschara lichenoides* (Busk, not M. Edwards) and *E. distoma*. At present, at any rate, I think it is better to keep this species under *Escharipora*, of which it may be taken as the type. It forms the transition between *Microporella* and *Adeona* and *Adeonellopsis* (McG.). The avicularian mandibles have no projecting articular processes as are found in *Adeonellopsis*, but not, so far as I am aware, in the true *Microporellæ*. These processes are not, however, as Busk supposed, confined to the *Adeona* group. I cannot agree with those authors who would unite *Adeona* and *Adeonellopsis* with *Microporella* for the sole reason of the presence of zoœcial pores, as, besides the multiple or simple presence of these pores, there are other important differences which will be discussed when describing *Adeonellopsis*.

EXPLANATION OF FIGURE.

PLATE 175.—Fig. 12, Group of zoœcia before calcification has so far advanced as to cause depression of the zoœcia.

The specimens and descriptions of the species figured in this plate have been contributed by Mr. MacGillivray.

FREDERICK McCOY.



P. H. Macgillivray del.
J. Ripper lith.

Prof. Mc Coy dirext.

Steam. litho. Govt. Printing Office.

PLATE 176, FIG. 1.

STOMATOPORA GEMINATA (McG.).

[Genus STOMATOPORA (BRONN). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cyclostomata. Family Tubuliporidæ.)

Gen. Char.—Zoarium adnate, simple or irregularly branched; branches linear or ligulate. Zoœcia in single series or in more or less regular transverse rows.]

DESCRIPTION.—Zoarium branched; branches obscurely concentrically rugose; surface with numerous small, brown, white-bordered puncta or pores. Zoœcia separated by shallow sulci, opening in pairs or triplets; mouths projecting, turned rectangularly forwards, and closely united together laterally throughout their length.

PT. REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., March 1886.

EXPLANATION OF FIGURE.

PLATE 176.—Fig. 1, specimen magnified.

PLATE 176, FIG. 2.

FLOSCULIPORA PYGMÆA (McG.).

[Genus FLOSCULIPORA (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cyclostomata. Family Discoporellidæ.)

Gen. Char.—Zoarium small, pedunculate, the peduncle consisting of smooth tubes or ridges, with intervening cancelli towards the upper part. Zoœcia opening on the expanded summit, the peristome produced, dimidiate or lacerated, with numerous intermediate cancelli.]

DESCRIPTION.—Peduncle composed of polished tubes, close together below, but separated above by intervening cancelli. Zoœcia in distinct series at the margin, but confused towards the centre; peristome of the external produced, dimidiate, bifid or lacerated, of the internal very little developed and frequently represented by a small spinous process. Cancelli between the rows of zoœcia, externally large, towards the centre small and much resembling the zoœcia.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

This exquisite little species forms tufts about $\frac{1}{12}$ of an inch high, and resembles a microscopic bouquet of flowers. It is attached to the zoœcia of Catenicella. The external zoœcia are very distinct, those on the outside continuous with the outer tubes of the stem. No doubt the whole peduncle is composed of the lower tubular parts of the zoœcia.

EXPLANATION OF FIGURES.

PLATE 176.—Fig. 2, specimen, natural size. Fig. 2*a*, the same, magnified.

PLATE 176, FIG. 3.

LICHENOPORA MAGNIFICA (McG.).

[Genus LICHENOPORA (DEFRANC). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cyclostomata. Family Discoporellidæ.)

Gen. Char.—Zoarium adnate or partially free, frequently discoid or cupped, usually growing on a basal lamina, with a thin external margin. Zoœcia partially free, disposed irregularly or in radiating series, with the intermediate surface cancellated, the cancelli, however, sometimes very obscure or almost wanting; peristome usually lacerated or pointed to one side.]

DESCRIPTION.—Zoarium encrusting, thick, raised into irregular mounds. Zoœcia frequently closed by a membrane a short way down, either entire or with a circular aperture in the centre; orifice very irregular in size, usually oval, with the peristome produced on one side into a thick, spout-like, nearly erect projection, or sometimes divided. The zoœcia in many parts arranged on slightly elevated ridges, radiating from a depressed central portion; in the lower and intervening zoœcia the peristome slightly developed, although often divided into two or three narrow processes; those on the ridges with the spout-like peristome entire or with small secondary processes on the sides, always pointing towards the central depression.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1886.

Port Phillip Heads, Mr. J. B. Wilson.

The largest specimen I have seen spreads as an encrusting layer over a calcareous mass, composed of *Cellepores* and other polyzoa, and covers an extent of upwards of six inches. The whole is covered with large, irregular elevations, which are again nodulated. These large elevations are in part caused by the elevation of the calcareous zoophytal mass on which it grows, but several of the nodules, having a diameter of a quarter of an inch or more, are entirely of this species, and in parts the continuous layer is of an equal thickness. As in other species, the zoarium extends by a basis or lamina, on which the cells are developed. The zoœcia are allied to those of *L. (Discoporella) pristis*, of which it may possibly prove to be a variety. The zoœcia between the rays and generally over the zoarium have the peristome not produced, or but slightly, and divided into two or three sharp processes. Those on the ridges have it produced on one side into a stout, spout-like process directed towards the centre of the elevation.

EXPLANATION OF FIGURES.

PLATE 176.—Fig. 3, portion, natural size, showing groups of radiating ridges. Fig. 3*a*, small portion, magnified, showing two ridges and the intervening depressed portion.

PLATE 176, FIG. 4.

LICHENOPORA BULLATA (McG.).

DESCRIPTION.—Zoarium encrusting, thick, irregular. Zoœcia irregular in shape and size, prismatic, with rounded angles; walls thick, with numerous internal, minute, sharp spines. The zoœcia at the edges of the oœcia with an elongated peristome on one side, spout-like or divided, directed towards the elevation. Oœcia scattered over the zoarium, large, bullate, minutely punctate or perforated, the zoœcia underneath closed by a minutely punctate membrane or plate.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July 1886.

Port Phillip Heads, Mr. J. B. Wilson; Warrnambool, Mr. Watts; Portland, Mr. Maplestone.

In these two species the cancelli are very obscure or absent; there are smaller apertures of which it is difficult to say whether they are really cancelli or aborted zoœcia. This subject, as well as the relations and differences between the Tubuliporidæ and Discoporellidæ, will be recurred to when describing the other species.

The generic name *Lichenopora*, having priority over that of *Discoporella*, ought to be retained.

EXPLANATION OF FIGURES.

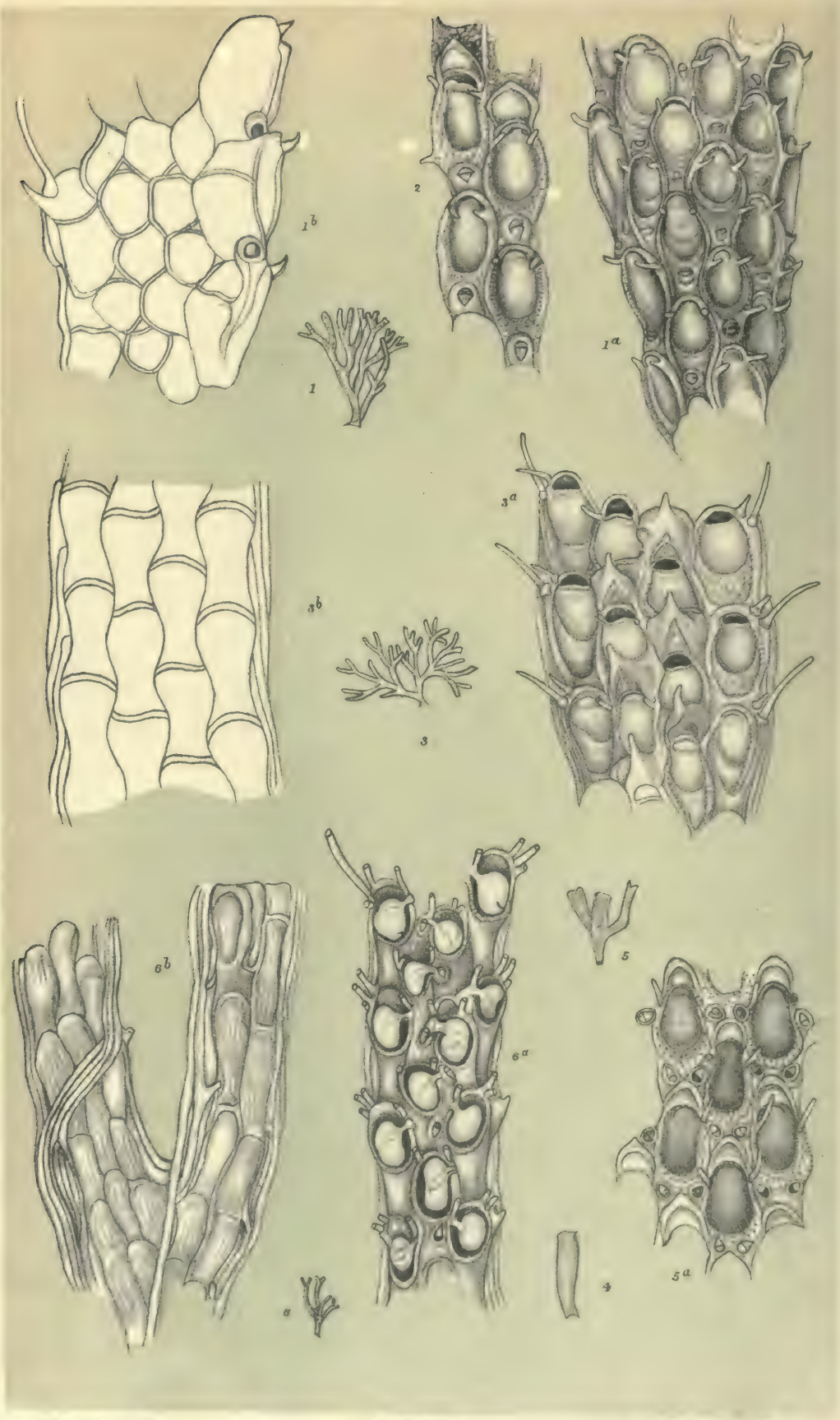
PLATE 176.—Fig. 4, specimen, natural size. Fig. 4*a*, portion magnified, showing an oœcium which has been opened to expose the orifices of the subjacent zoœcia. Fig. 4*b* and 4*c*, zoœcia from other parts of the same.

The specimens figured on this plate have been presented to the National Museum, and the descriptions to this work, by Mr. MacGillivray.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Polyzoa)



P. H. Macgillivray del.
J. Rupper lith.

Prof. M^c Coy direx.

Steam Litho. Gov^t Printing Office

PLATE 177, FIGS. 1 AND 2.

CRASPEDOZOUM LIGULATUM (McG.).

[Genus CRASPEDOZOUM (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Flustridæ.)

Gen. Char.—Zoarium erect, in ligulate divisions, uni- or bi-laminate, each branch bordered throughout its whole extent by a bundle of radical fibres springing from the bases of the lateral zoœcia. Zoœcia quadrate, aperture partly filled in by a thickened lamina. Oœcia external.]

DESCRIPTION.—Zoarium unilaminate, erect, dichotomously divided into narrow ligulate lobes. Zoœcia ovate, aperture partly filled in by a finely granulated thickened lamina; a sharp spine on each side above. A single avicularium on an eminence at the base of the zoœcia. Posteriorly the outlines of the zoœcia irregularly rhomboidal. Oœcia mitriform, thickened at the upper margin, leaving a depressed area in front.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1885.

Port Phillip Heads.

EXPLANATION OF FIGURES.

PLATE 177.—Fig. 1, specimen, natural size. Fig. 1*a*, anterior surface of portion of a branch of the same, magnified. Fig. 1*b*, posterior surface of the same. Fig. 2, small portion of another specimen showing the oœcia.

PLATE 177, FIG. 3.

CRASPEDOZOUM SPICATUM (McG.).

DESCRIPTION.—Zoarium unilaminate, erect, dichotomously divided into narrow ligulate lobes. Zoœcia ovate, margins granular and lower part of aperture filled in by a thickened granular lamina; an erect spine at each side superiorly, and in the marginal zoœcia an additional longer spine below the usual one at the outer angle. A sessile avicularium on an umbonate eminence frequently at one side of the base of the zoœcia, but often absent. Oœcia mitriform, produced upwards into a prominent apiculate spine; anterior area very small. Posteriorly the zoœcia elongated, straight above, constricted in the middle.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1885.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

EXPLANATION OF FIGURES.

PLATE 177.—Fig. 3, specimen, natural size. Fig. 3*a*, portion of same, magnified, anterior view. Fig. 3*b*, posterior view.

PLATE 177, FIGS. 4 AND 5.

CRASPEDOZOUM ROBORATUM (HINCKS, SP.).

DESCRIPTION.—Zoarium bilaminate, divided into flat, broadly-ligulate lobes. Zoœcia quadrate; aperture occupying greater part of the front, the sides and base partly filled in by a sloping, thickened, granular lamina; a single erect spine on each side above. On each side at the base of the zoœcia, except the marginal, a sessile avicularium on a rounded elevation, with the mandible directed obliquely outwards; the marginal cells with only a single avicularium. Oœcia somewhat mitriform, the upper rim thickened, leaving a depressed area inferiorly.

REFERENCES.—*Membranipora roborata*, Hincks, Ann. and Mag. Nat. Hist., Aug. 1881; *Flustra membraniporides*, Busk, "*Challenger*" Polyzoa, pt. i, p. 54, pl. xxxii., fig. 7.

Port Phillip Heads.

These three forms constitute a well marked group, for which I have proposed the name *Craspedozoum*. It is allied to *Flustra* and *Membranipora*, or more properly to *Biflustra*, in the structure of the zoœcia, and to the first named in the lobulate and erect habit of growth.

C. roboratum and *C. ligulatum* are much allied, and farther observation may show that they ought to be ranked as varieties of one species. In *C. ligulatum* the lobes, besides being unilaminate are much narrower, the zoœcia are narrower, and there is usually only a single avicularium at the base of each, while in *C. roboratum* the lobes are broader, with about double the series of zoœcia, and there are two avicularia on the zoœcia, except in the marginal where there is only one. *C. spicatum* is quite distinct; the zoœcia are not so calcareous, there is a larger filling in of the aperture, there is a single, frequently lateral avicularium similar to that of *Canda*, a second larger spine at the outer angle of the marginal zoœcia, and the posterior aspect of the zoœcia is of an entirely different shape. The oœcia also differ markedly in being produced upwards into a sharp apiculate point or spike, and the anterior depressed area is very small.

EXPLANATION OF FIGURES.

PLATE 177.—Fig. 4, portion of specimen, natural size. Fig. 5, another specimen, natural size. Fig. 5*a*, portion of same, magnified.

PLATE 177, FIG. 6.

MENIPEA FUNICULATA (McG.).

[Genus MENIPEA (LAMX.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellularidæ.)

Gen. Char.—Zoarium articulate or (in one species) continuous. Zoœcia bi-multiserial, oblong, imperforate behind. A sessile, lateral avicularium (frequently absent), and one or two sessile avicularia (also frequently absent) on the front of the zoœcia. No vibracula.]

DESCRIPTION.—Zoarium continuous, dichotomously branched; branches narrow, bordered by radical fibres springing from the lower part of the back of the cells. Zoœcia multiserial, elongated, aperture large, elliptical, with a slightly thickened margin, and overlapped by a large sacculated fornix; the marginal zoœcia with three spines at the outer angle and one at the inner; the central with a single spine at each side. A sessile avicularium (usually absent) attached to the upper and outer angle of the lateral zoœcia; a sessile avicularium on the front of each zoœcium, except the marginal, usually close to the peduncle of the fornix of the adjoining zoœcium. Zoœcia posteriorly quadrate, smooth or faintly longitudinally sulcate. Oœcia prominent, rounded, smooth.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov. 1885; *? M. benemunita*, Busk, *Challenger*, Pol., pt. i., p. 19, pl. iv., fig. 4.

Port Phillip Heads.

Differs from the other species of *Menipea* in the zoarium being continuous and in the margin of radical fibres.

EXPLANATION OF FIGURES.

PLATE 177.—Fig. 6, specimen, natural size. Fig. 6*a*, anterior view of portion of same. Fig. 6*b*, posterior view, showing attachment of radical fibres.

I am indebted for the specimens and descriptions of the Polyzoa on this plate to Mr. MacGillivray.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Polyzoa)

F.R. Macgillivray del.
J. Ripper lith.

Prof. McCoy direxit

Stran: litho Govt Printing Office

PLATE 178, FIG. 1.

ÆTEA RECTA (HINCKS).

[Genus ÆTEA (LAMX.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Æteidæ.)
Gen. Char.—Zoœcia arising from a creeping or partially free stolon which is dilated at intervals, tubular, with a subterminal membranous aperture. No avicularia or oœcia.]

DESCRIPTION.—Zoœcia rising from large inflations of a creeping stolon, erect, truncated, upper portion straight and not enlarged; aperture long, lateral; lower part of zoœcium finely ringed, the rings ceasing immediately above the commencement of the aperture, the upper part being finely punctate.

REFERENCE.—Hincks, Brit. Mar. Polyzoa, p. 6, pl. i., figs. 6 and 7.

Port Phillip Heads.

Readily distinguished from the other species by the erect, straight habit, the truncated extremity, the upper part being scarcely if at all dilated, and the length of the aperture, which is about a third of that of the whole zoœcium. I see no reason for considering this as a variety of *Æ. anguina*, as has been done by some writers.

EXPLANATION OF FIGURE.

PLATE 178.—Fig. 1, specimen, magnified, showing stolon and zoœcia.

PLATE 178, FIGS. 2 AND 3.

SCRUPARIA CHELATA (LINN. SP.).

[Genus SCRUPARIA (OKEN). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Eucrateidæ.)
Gen. Char.—Zoarium composed of tufts springing from a creeping, adherent base; branches originating from the front of a zoœcium, below the aperture. Each zoœcium arising from the preceding by an articulated tube at the upper and posterior part.]

DESCRIPTION.—Zoœcia glassy, horn-shaped, very narrow below and widened above, aperture very large, oblique, truncated above, with a distinct raised, smooth margin, usually an aborted zoœcium below the aperture.

REFERENCE.—*Scruparia chelata*, Busk, Brit. Mus. Cat., Mar. Pol., pt. i., p. 29, pl. xvii., fig. 2; *Eucratea chelata*, Hincks, Brit. Mar. Pol., p. 14, pl. i., fig. 3; pl. ii., figs. 4–8; pl. iii., figs. 9–12.

Port Phillip Heads, on algæ and zoophytes.

The branches of this elegant little species usually spring from dilatations of a slender creeping stolon very similar to that of *Ætea* ; at other times, instead of dilatations, there are decumbent zoœcia connected by a creeping annulated tube, a branch rising from below the aperture. They also sometimes arise directly from the primary cell which is short, circular, and with a rounded aperture occupying the whole of the contracted summit. The zoœcia are much elongated, attenuated below, each giving origin by its summit to another connected by a short annulated tube. The secondary branches are few and originate from the front of the zoœcia just below the aperture. When there are no branches there is usually an aborted stem of a zoœcium. I have not seen the oœcia, Mr. Hincks describes them as mitriform, somewhat pointed above, with a keel down the centre, borne below the aperture on an imperfectly developed cell.

EXPLANATION OF FIGURES.

PLATE 178.—Fig. 2, portion of a branch, magnified. Fig. 2*a*, portion of creeping stolon of same. Fig. 3, portion of another specimen, seen from above.

PLATE 178, FIGS. 4 AND 5.

RHABDOZOUM WILSONI (HINCKS).

[Genus RHABDOZOUM (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Rhabdozoidæ.)

Gen. Char.—Zoarium phytoid, erect, consisting of celliferous, cylindrical, bifid or trifid shoots, attached by numerous radical fibres springing from the sides ; straight hollow chitinous rods springing from the sides of the primary shoots and supporting on their summits other celliferous branches. Zoœcia pyriform, with a considerable oblique aperture, arranged in longitudinal series round an imaginary axis. Avicularia sessile.]

DESCRIPTION.—Zoarium consisting of branches supported on transparent, hollow chitinous rods, springing from the sides of celliferous shoots attached by bundles of radical fibres; each rod spirally twisted, slightly at its commencement and more strongly at its upper extremity where it is enlarged into a disc or sort of calyx, surmounted by a circle of long, spreading and incurved glassy spines; each calyx giving origin to a short branch which immediately divides into usually three. Zoœcia pyriform, slightly turned forwards above, each connected with the preceding immediately behind its upper extremity, arranged in parallel longitudinal series round the axis; immediately below the aperture a transverse row of two or three

long, glassy, hollow spines, articulated to bulbous processes, spreading outwards and curving upwards; in many zoœcia a sessile avicularium in the place of these spines, with the sharp beak and triangular mandible directed forwards. Oœcia rounded, terminal.

Reference.—Hincks, Ann. and Mag. Nat. Hist., Aug. 1882.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

This curious and beautiful species forms small, phytoid, branching tufts, attaining a height of an inch or upwards. The basal shoots consist of cylinders of zoœcia and are bi- or trifurcate. They are attached by a mass of radical fibres springing from the surface of the zoœcia. Besides these radical fibres, a few (2 to 7) hollow, chitinous rods arise from the sides of the shoots and are directed upwards. They are beautifully transparent, glassy, and strongly convoluted towards the summit. The summit is expanded into a small disc fringed by a row of long, hollow, articulated spines. Above the expansion a short celliferous branch rises, almost immediately dividing into three, one or more of which may again bifurcate. The zoœcia are arranged in linear series round the axis in such a manner that their apertures form a spiral. The zoœcia immediately succeeding the rods have usually a larger number (3 or 4) of spines than the others. The rods are of considerable length, sometimes more than half as long as the supported branches. The radical fibres proper are of the usual brownish appearance, waving and forming bundles, they are fixed to the supporting body by rosettes.

Explanation of Figures.

Plate 178.—Fig. 4, specimen, natural size. Fig. 4*a*, portion of same, magnified; this was not very perfect and does not properly show the expanded upper parts of the rods. Fig. 5*a*, portion of a branch more highly magnified, showing zoœcia with their spines and avicularia. Fig. 5, small portion from another specimen, to show the oœcia.

Plate 178, Fig. 6.

FARCIMIA APPENDICULATA (Hincks).

[Genus FARCIMIA (Pourtales). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cellulariidæ.)

Gen. Char.—Zoarium calcareous, erect, branching; stems and branches composed of segments united by corneous joints. Zoœcia arranged in series round an imaginary axis, with elevated margins and depressed area, which is more or less covered in with membrane.].

DESCRIPTION.—Zoarium dichotomously branched, the internodes short and connected by double tubes. Zoœcia arranged round the axis in four series, three or four in each series, alternate, elliptical or ovate, with the sides raised into a thin margin; aperture occupied by a thin membrane which is thickened for a small space inferiorly. A subimmersed avicularium on either side of the zoœcia, those of the adjacent series occupying a separate tract; the anterior surface bounded by a thickened margin, the intermediate part being occupied by a membrane; at the summit a small beak, with sharp, curved point, the mandible pointing outwards.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., March 1883.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

The structure of the zoœcia of *Farcimia* undoubtedly places it among the *Cellulariidæ*. The avicularia are comparable, as pointed out by Mr. Hincks, to those of *Scrupocellaria*, from which they differ in having the free side occupied by a membrane and bounded by a thickened band; the beak and mandible are very small. Frequently a peculiar narrow, membranous appendage, terminating in a hard, sharp point, springs from the side of the avicularium.

EXPLANATION OF FIGURES.

PLATE 178.—Fig. 6, portion of specimen, natural size. Fig. 6*a*, internode, magnified. Fig. 6*b*, appendage of avicularium.

PLATE 178, FIG. 7.

CATENICELLA RINGENS (BUSK).

[Genus CATENICELLA (BLAINVILLE). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Catenicellidæ.)

Gen. Char.—Branches originating from the summits of each of a geminate pair, or rarely from the sides of ordinary zoœcia. Zoœcia in single series, but at a bifurcation geminate, or each internode consisting of a geminate pair; mouth with simple margins, straight or hollowed and entire below, or with a small rounded notch.]

DESCRIPTION.—Zoarium dichotomously branched. Zoœcia broadly ovate, smooth and shining; a broad anterior vitta on each side extending from the base to near the level of the mouth; a large, lateral process, slightly turned forwards, on each side, with a widely gaping avicularium and a round mark at the base; mouth lofty, slightly hollowed below. Posterior surface smooth.

REFERENCE.—Busk, Brit. Mus. Cat., Mar. Pol., pt. i., p. 10, pl. viii., figs. 3 and 4.

Port Phillip Heads, seemingly very rare.

Easily distinguished by the smooth zoœcia, the anterior vittæ and the large gaping avicularia. The lateral process on one side is frequently larger.

EXPLANATION OF FIGURES.

PLATE 178.—Fig. 7, anterior surface of portion of branch. Fig. 7*a*, posterior surface of ame.

PLATE 178, FIG. 8.

DIMETOPIA HIRTA (McG.).

[Genus DIMETOPIA (BUSK). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Eucrateidæ.)

Gen. Char.—Zoœcia arranged in pairs united back to back, each pair looking at right angles to that below; at a bifurcation the zoœcia of a pair disjunct, and each giving rise to the first pair of a branch.]

DESCRIPTION.—Zoœcia with the aperture very oblique, narrowed below, slightly arched above, margin thickened; 3 to 5 stiff spines articulated above, 3 or 4 very long, submarginal on each side, the uppermost generally a little farther back and directed more posteriorly, usually 2 spines below. Oœcia globular, surmounting the zoœcia.

REFERENCE.—P. H. McGillivray, Tr. Roy. Soc. Vict., Nov. 1885.

Port Phillip Heads.

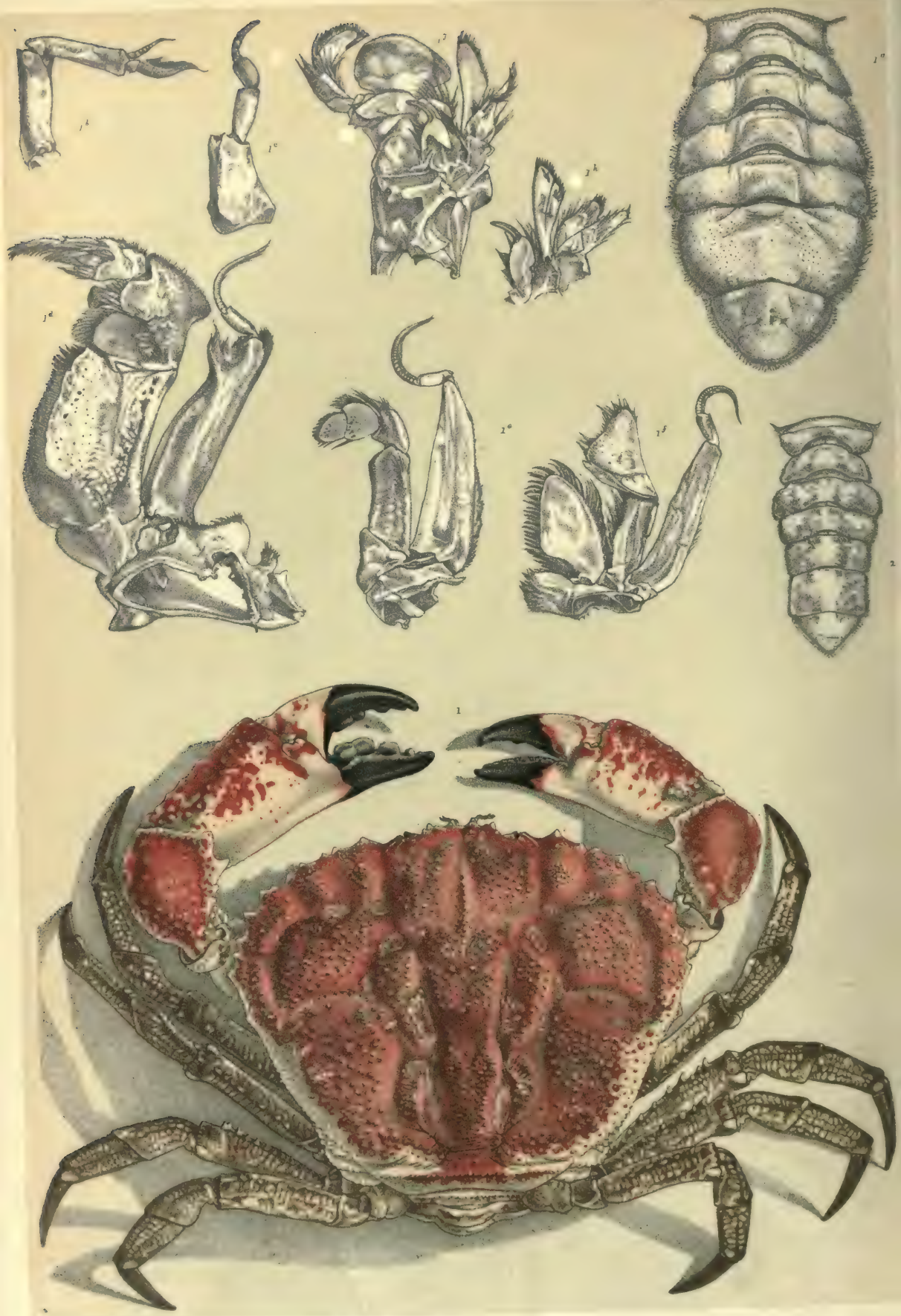
Nearly allied to *D. cornuta*, from which it is distinguished by the difference in number and arrangement of the spines. Of these there are usually 3 short and straight, directed upwards; on each side there are 3 or 4 very long, articulated immediately beyond the margin, the uppermost being situated a little posteriorly and directed more backwards; there is a single one or occasionally two below. The oœcium is globular, surmounting a zoœcium, and in the specimen figured it is embraced by two long spines, one on each side. I am not certain that this arrangement is constant.

EXPLANATION OF FIGURE.

PLATE 178.—Fig. 8, portion of branch, magnified.

The specimens and descriptions of the interesting Polyzoa on this plate are from Mr. McGillivray.

FREDERICK McCOY.



W.H.J. Wild, del. et lith.

Prof. McCoy, direxit.

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Prof. M.r Coy direct.

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PLATES 179 AND 180.

PSEUDOCARCINUS GIGAS (LAM. SP.).

THE GREAT RED KING-CRAB.

[Genus PSEUDOCARCINUS (MILNE-EDWARDS). (Sub-kingdom Articulata. Class Crustacea. Section Podophthalmata. Order Decapoda. Tribe Brachyura. Family Canceridæ.)

Gen. Char.—Carapace gently arched in front half, narrowed and truncated behind; wider than long, moderately depressed, the various regions and subregions elevated and embossed; front nearly horizontal, lateral anterior margins moderately curved, armed with projections or teeth; posterior lateral margins straight, converging; hind margin narrow, straight; basal joint of the external antennæ very small; second joint scarcely reaching the front; third joint lodged in the orbital hiatus, but not filling it, so that the antennary fossa is not completely separated from the orbit; prelabial space not channelled; first pair of legs, especially in the male, forming very large pincers, the fingers of which are equally rounded and obtuse to the tip, unequal, and armed with very large, bluntly rounded tubercles, fewer and of greater size on the right claw,* which greatly exceeds the left in size. Hinder feet moderately long, simply pointed; abdomen of the male and female divided into seven distinct segments. Indian Ocean.]

DESCRIPTION.—Carapace slightly convex, anterior half tumid, posterior half more flattened, and bent downwards at an angle of about 145° from the anterior half; the protogastric, epibranchial, and metagastric regions tumid and bounded by broad deep furrows; the cardiac region is bounded by two furrows deeper and more angular than the rest, extending nearly to the hind margin; upper surface smooth as far as posterior margin of epibranchial and metagastric regions, behind which the surfaces of the cardiac and mesobranchial and metabranchial regions are rough with scattered conical tubercles of very irregular size. Front between the orbits forming four projecting lobes, between which the middle sinus is smaller than the other two; posterior superior external margin of each orbit incised by two deep parallel fissures; first joint of outer antennæ very small; second joint reaching lower edge of orbit; fourth, half the length of third joint and reaching edge of front; flagellum little larger than anterior lateral portion of the carapace, with about eleven irregular, conical tubercles and divided into four lobes by small indentations on upper surface, but long narrow slits below, each lobe with two or three of the spines. Anterior legs or chelæ very large, the right much larger than the left†; movable finger (dactylopodite) rounded, moderately compressed, abruptly incurved at the obtuse tip; a little shorter than the fixed finger, with three elongate, large, slightly compressed teeth on the basal half of the inner margin, the anterior smallest, posterior largest, a very slight angular projection at about one-fourth the length from the tip; fixed finger slightly longer than the movable one, a little broader and more compressed, but similarly abruptly incurved at the blunt apex; inner margin with three very large, rounded tubercles on basal half, the middle one largest, and a slight compressed one about one-third from the tip; hand (propodite) very broad, rounded externally, moderately convex on inner and outer sides; carpus (carpopodite) with two strong spines on upper inner margin, which has also three or four slight blunt tubercles near its base; next joint (meropodite) trigonal, with the upper, sharp, angular margin with an irregular row of nine or ten blunt tubercles; four posterior pairs of legs, with the terminal joints

* Reversed in our plate.

† Reversed in the lithographing of our plate.

(dactylopodites) simply pointed, villous; the next two joints (propodites and carpodites) also villous, the pile forming a close covering on upper margin, but forming a netting to bare spaces on the sides; next joints (meropodites, ischiopodites, basipodites, and coxapodites) nearly naked, but with a row of five to seven irregular, conical tubercles on upper angle, and with one smaller tubercle at middle of upper distal margin, with a few minute tubercles on each side of meropodites. *Colour*: All the underside of body, three basal joints of chelæ, and underside, outerside, and most of innerside of chelæ, including base of pincers, and four hind legs, yellowish cream colour; upper surface of carapace scarlet; upper surface of carpus scarlet, mottled on the sides, with the ground cream colour; upper portion and variable portion of sides of hand mottled scarlet, and the ground cream colour; velvety, close, pilose covering of last joint, and upper edge of the penultimate and antepenultimate joints and the netted pattern on their sides formed by villous lines on the four posterior pairs of legs, of rich dark brown. Two fingers of chelæ rich purplish black. *Measurements of Male*: Width of carapace, 11 ins. 6 lines; length from front to posterior edge, 9 ins.; greatest depth, 5 ins.; length of abdomen, 1 in. 8 lines; greatest width at third segment, 9 lines; length of basal joint (coxa or coxapodite) of chelæ, 1 in.; second joint (or basipodite), 7 lines; third joint (ischium or ischiopodite), 2 ins.; fourth joint (merus or meropodite), 4 ins. 6 lines; fifth joint, carpus (carpodite), 3 ins. 9 lines long, 3 ins. 7 lines wide at distal end; sixth joint (propodos or propodite), 1 ft. 3 ins. from base to tip of fixed finger, 5 ins. 6 lines to base of movable finger, 5 ins. 4 lines wide at distal end, and 3 ins. thick; seventh joint or movable finger (dactylopodite), 10 ins.; width at base, 2 ins. 3 lines; terminal joint (dactylopodite) of first pair of legs, 2 ins. 9 lines; penultimate joint (propodite), 2 ins. 6 lines; antepenultimate (carpodite), 2 ins. 3 lines; preceding joint (meropodite), 4 ins. 6 lines; next joint (ischiopodite), 1 in.; basal joint (coxapodite), 1 in. *Female:* Much smaller than male, and with all the regions of the carapace set with irregularly sized and spaced conical tubercles about their middles, the boundaries of each region and subregion being smooth. Anterior chelæ very much smaller than in the male, and more nearly equal to each other, and the fingers of the pincers much shorter and tuberculated from base nearly to apex. In addition to the spines on the carpus and other portions of the legs, as in the male, the hand has three or four large conical spines near base of upper rounded margin, and an irregularly scattered and sized series of smaller conical tubercles thence to base of movable finger (dactylopodite). About five large blunt tubercles on inner edge of movable finger, extending from base nearly to the tip, and four rather larger on corresponding intervals of fixed finger on right hand. On left, or smaller, chelæ the fixed finger is much more compressed on inner edge, and the four or five tubercles still more compressed and less prominent than on the right. Inner edge of fixed finger much more compressed and with proportionately much smaller, more compressed, and less prominent tubercles than on right side. Abdomen enormously large, of seven very distinct segments. *Measurements:* Length of carapace from front to posterior margin, 8 ins. 6 lines; greatest width, 10 ins. 6 lines; length of abdomen, 8 ins.; greatest width (at sixth segment), 4 ins. 2 lines; length of right hand from carpus to tip of fixed finger, 6 ins. 6 lines; length of movable finger, 3 ins. 2 lines; greatest width of hand at base of movable finger, 3 ins.

REFERENCE.— =*Cancer gigas*, Lam., Hist. des An. sans vert, v. 5, p. 272; Milne-Ed. Hist. Nat. des Crust., v. 1, p. 409.

This gigantic and beautifully coloured crab is now figured entire and of the colours of life for the first time. It is not uncommon at the western extremity of the coast-line of the colony, particularly

about Portland, from whence examples are often brought to the fish-market. The small female with the much smaller claws seems more common than the great male with its immense powerful pincers.

EXPLANATION OF FIGURES.

PLATE 179.—Fig. 1, female, about one-third natural size. Fig 1*a*, abdomen of female, one-third the natural size. Fig. 1*b*, antennules, or inner antennæ, movable portion without great fixed base, twice the natural size. Fig 1*c*, antennæ, or outer antennæ, without the small basal joint, twice the natural size. Fig. 1*g*, mandible and first and second maxillipedes, natural size. Fig. 1*d*, third or external maxillipede, natural size. Fig. 2, abdomen of male, one-third natural size.

PLATE 180 —Fig. 1, male, about one-third natural size. (For abdomen, see pl. 179, f. 2).

FREDERICK McCOY.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XVIII.

BY

FREDERICK McCOY, C.M.G., M.A., Sc. D. CANTAB., F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF THE NEW ZEALAND INSTITUTE; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.

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PREFACE.

The first plate in this Eighteenth Decade represents a newly-discovered, third species of Blue-tongued Lizard, *Cyclodus occipitalis*, very rare in Victoria, the only examples I have seen being from the North-Western District; remarkable for the great number and size of the occipital plates on the back part of the head.

The second plate shows one of the largest and most conspicuously coloured of our food fishes, the true Yellow-Tail, *Seriola Lalandi*.

The third and fourth plates show two of the many varieties of another of our large and often beautifully-coloured food fishes, the *Chilodactylus carponemus*, not figured of the natural tints before.

The next four plates continue our illustrations of Victorian Polyzoa, through the kindness of Mr. MacGillivray, whose extensive collection is given with the descriptions for the National Museum and this work.

Plates 179 and 180 give for the first time complete figures of the living colours, of both sexes, of the Great Red King-Crab of the Colonists, *Pseudocarcinus gigas*, which greatly exceeds in size and brilliancy of colour any other species of the family *Cancerida*.

The succeeding Decades will illustrate as many different genera as possible, and deal first, usually, with species of some special interest and of which good figures do not exist or are not easily accessible.

FREDERICK McCOY.

25th May, 1889.

D' Wild del. et lith.

Government Printing Office

PLATE 181.

TYMPANOCRYPTIS LINEATA (PETERS).

THE WHITE-STREAKED EARLESS LIZARD.

[Genus TYMPANOCRYPTIS (PETERS). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Strobilosaura. Family Agamidæ.)

Gen. Char.—Head short, rounded; no external ear-drum. Body broad, depressed; tail long, tapering, round. Scales of back irregularly flat, scale-shaped, or spinose; no dorsal crest. No gular sack; a strong transverse gular fold; one preanal pore on each side, sometimes absent in female; no femoral pores. Australia.]

DESCRIPTION.—Body short, thick, fusiform; tail little longer than the head and body. When the hind leg is drawn forward along the side, the longest toe reaches the shoulder. Head short, blunt, semioval, with a convex profile arched downwards from the occiput; nostril in a large nasal plate, a little nearer to the eye than to the tip of the snout. Scales of head irregular in size and shape, very strongly keeled; those of back strongly keeled, chiefly small and rhombic, but with numerous larger, conical, compressed, arched, spinose scales, very irregularly scattered, not forming distinct continuous keels, except one from end of mouth to shoulder, and a shorter and less distinct one over its hinder half; a strong ridge-like fold from axil to thigh on each side; scales of throat, belly, and underside of thighs rhombic, posterior angle prominent and middle slightly convex but not distinctly keeled; scales of upper and under sides of tail very strongly keeled, forming continuous ridges. *Colour:* Pale brown above, ashy white below; head, two rows of large quadrate spots along back, and transverse bands on upper surface of legs and thighs and across the tail, of dark rich chocolate-brown, becoming paler on posterior half of tail, and forming ashy brown, irregular, transverse bands on sides; five narrow white lines, one in middle of back from occiput to base of tail, one on each side (often interrupted) from head to anterior third of tail, and one on each side, coinciding with the prominent lateral fold from axil to thigh; a conspicuous, narrow, whitish, open chevron mark crosses the head from a little behind middle of each eye, with a round white spot in front of it, and one smaller near tip of snout and one on each side; a few irregular whitish marks on sides and back of head. Throat strongly mottled with broad, irregularly flexuous, longitudinal, blackish bands; belly more faintly mottled or plain ashy white. *Measurements:* Total length, 4 in. 8 lines; length of head, 6½ lines; width of head, 6 lines; width of body, 7 lines; length of body, 1 in. 8 lines; length of tail, 2 in. 5½ lines; length of fore limb, 11 lines; length of hind limb, 1 in. 3 lines; from axil to thigh, 1 in. 1 line.

REFERENCE.—Peters Monats Bericht. Berlin Akad., 1863, p. 230.

The species of *Tympanocryptis* are remarkably distinguished from all of the genus *Grammatophora* or *Amphibolurus* by the ear-openings being absent or entirely concealed by being covered over by the ordinary scales of the adjacent parts of the head. The

present species, at first glance, resembles the young of the *G. muricata* or "Blood-sucker" of colonists, figured on our plate 111, so much as to be easily mistaken for it. The absence of the large distinct external tympanum easily distinguishes it, however, as well as the shorter blunter head ; the large pointed scales being irregularly scattered instead of forming distinct median and lateral keels, and the absence of femoral pores on the underside of the thigh are also ready distinctions. Most specimens have no preanal pores, but occasionally there is one large, prominent preanal pore on each side, as in the genus *Diporophora* (which, however, has distinct external ear-drums).

The habits of this little Lizard are entirely different from those of the *G. muricata*, never ascending trees or bushes like that creature, but inhabiting stony plains and retreating into small holes, like those of the "Trap-door Spider," in the ground when alarmed.

Not very uncommon at Essendon and plains near Sunbury, &c., to the north of Melbourne.

This interesting reptile has not been figured before.

EXPLANATION OF FIGURES.

PLATE 181.—Fig. 1, average specimen, natural size, side view. Fig. 1*a*, head, viewed from top, magnified two diameters. Fig. 1*b*, head and neck, side view, showing absence of ears, magnified two diameters. Fig. 1*c*, front view, showing large chin plate, magnified two diameters. Figs. 1*d*, 1*e*, underside of foot, magnified two diameters. Fig. 1*f*, preanal pores, magnified three diameters. Fig. 1*g*, scales of neck, magnified three diameters to show spines. Fig. 1*h*, spinose scales of dorsal portion of side and smooth scales of ventral portion of side, magnified three diameters. Fig 2, another specimen, viewed from above. Fig. 3, young, short-tailed specimen, about entering hole.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Fishes)

J. Smithson on del. et Lith.
Fred. M.c Coy direx.
Steam Litho. Govt. Printing Office

PLATE 182.

SILLAGO CILIATA (CUV. AND VAL.).

THE PLAIN WHITING.

[Genus SILLAGO (CUVIER). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Family Trachinidæ.)

Gen. Char.—Body elongate, subcylindrical, moderately compressed; head conical; mouth small, with thick lips; upper jaw a little longer than the lower, protrusile; eyes lateral and a little upwards; teeth in cardiform patches on jaws (outer row sometimes longer) and vomer, none on palatines. Operculum with a sharp posterior spine; preopercula serrated, approaching each other below. Branchiostegal rays six. Scales of moderate size, ctenoid. Two contiguous dorsals, the first high, of nine to twelve slender spines, the hinder longer but lower. Pectorals moderate; ventrals thoracic, of one spine and five rays; anal like second dorsal. Bones of head with wide muciferous ducts. Pseudobranchiæ. Air-bladder simple. Pyloric cæca few. Red Sea to S. Australia.]

D. 11 + 1/17; A. 2 + 16; P. 15; V. 1 + 5; C. 19; L.l. 70 $\frac{6}{13}$ (about fourteen rows of additional minute scales on caudal fin).

DESCRIPTION.—Greatest depth over middle of pectoral in front of dorsal; declining thence with slight convexity to the thick compressed pedicle of tail; more convexly arched to eye, from whence the profile of the conical compressed head is nearly straight in its downward slope to the very small protrusile mouth, with thick fleshy lips; smooth portion of head from eye to maxillary on side with wide shallow muciferous openings and channels; space on top of head nearly flat, very slightly convex, covered with large scales nearly half-way from eye to snout; cheeks, operculum, and preoperculum covered with scales larger than on top of head; posterior vertical and horizontal edge of preoperculum serrated; operculum with one, angular, flat spine a little above base of pectoral. *Teeth:* About twelve rows of minute, within the outer row of larger, ones on jaws. *Fins:* First dorsal high, of eleven slender spines, second longest; interval between dorsals less than between spines of first dorsal; second dorsal lower than the first, declining gradually from the first branched ray, which is longer than the spine, to the posterior end; caudal concave, with thick branched rays; anal similar in shape to second dorsal, but shorter and less deep; pectoral moderate, triangular; ventrals a little behind base of pectorals. A row of small, oblong, transverse scales behind each spine and ray of dorsal and anal fins. *Colour:* Back dark brownish-olive with bluish and green reflections, brighest on nape; pale-brownish on sides, fading into pearly-white along belly and underside of tail; head purplish-brownish; iris white, with yellow border; caudal fin dark brownish-olive, rays lighter, membrane spotted with black, posterior edge and lower edge darkest; first dorsal nearly colourless, with faint blackish clouds; second dorsal with six to nine rows of narrow, transverse (fore and aft), oblong, brown marks, with rather wider pale intervals on the membranes; pectoral pale-yellowish, nearly colourless, with a large purplish-black spot at its base. Ventral and anal fins bright rich kings-yellow. *Measurements:* Length of figured specimen, 1 ft. 5 in. 6 lines. Comparative measurements to length, as 100:—Tip of snout (protruded) to anterior edge of eye, $\frac{12}{100}$; to posterior edge of eye, $\frac{17}{100}$; to first ray of dorsal, $\frac{33}{100}$; to edge of operculum, $\frac{24}{100}$; to first ray of second dorsal, $\frac{52}{100}$; to base of pectoral, $\frac{25}{100}$; to first ray of ventral, $\frac{27}{100}$; to first ray of anal, $\frac{56}{100}$; to last

ray of dorsal, $\frac{77}{100}$; to last ray of anal, $\frac{75}{100}$; space between eyes, $\frac{8}{100}$; length of caudal fin, $\frac{13}{100}$; greatest height of first dorsal, $\frac{15}{100}$; greatest height of second dorsal, $\frac{2}{100}$; greatest depth of anal, $\frac{7}{100}$; first ray of ventral, $\frac{11}{100}$; length of pectoral, $\frac{12}{100}$. Five scales in length of 1 inch at middle of body; four in same space vertically.

REFERENCE.—Cuv. and Val., Hist. Nat. des Poiss., v. 3, p. 415.

This is a rare fish in Victoria, sometimes named "Sydney Whiting" by fish dealers, who call all the species of *Sillago* "Whiting," not from any identity of the external characters, but from the similarity of the delicate white flesh, which is so good as to be welcome at the best tables. The popular name of "Plain Whiting" is appropriate, as it has none of the spots or stripes of the other species. Not figured before.

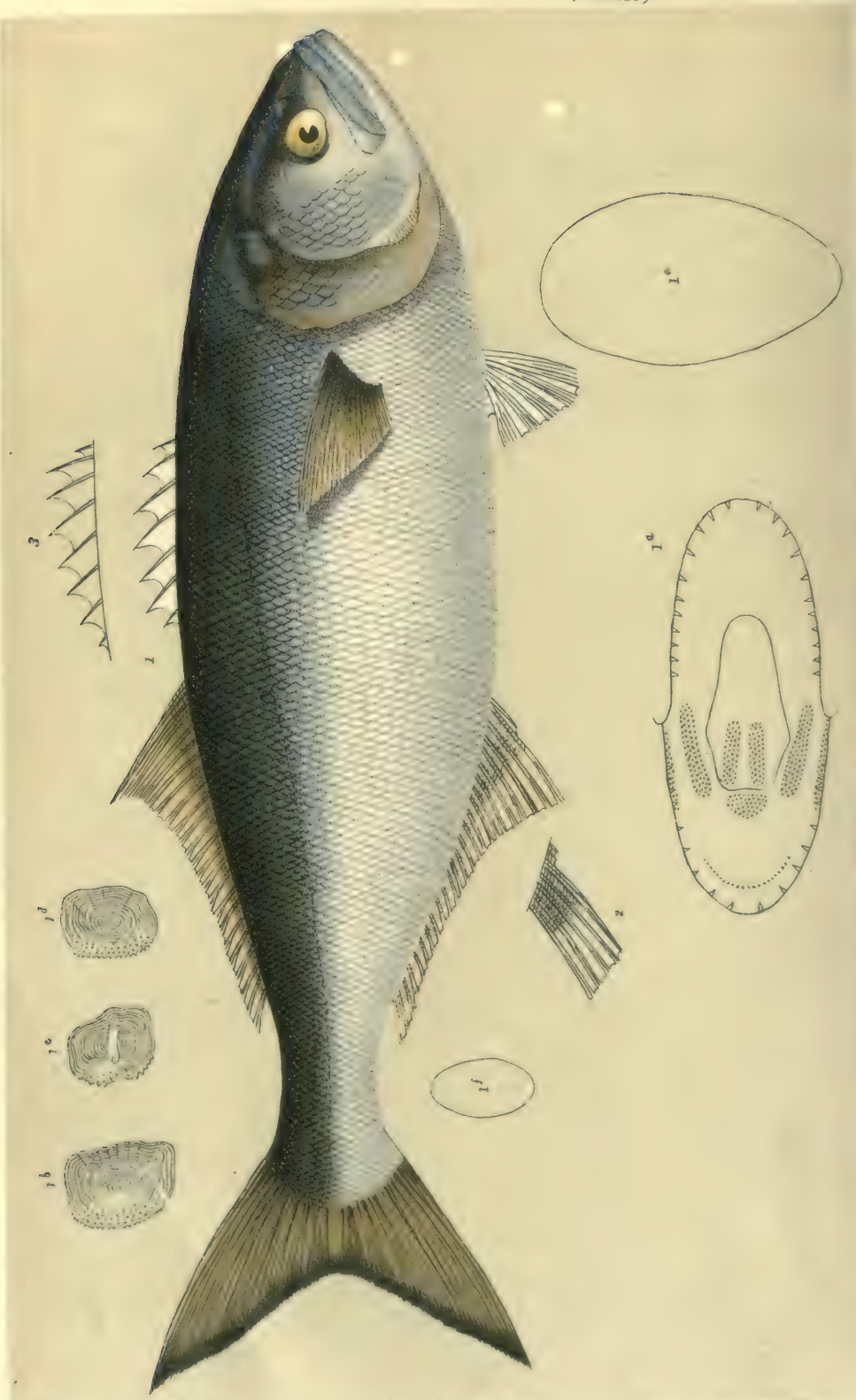
EXPLANATION OF FIGURES.

PLATE 182.—Fig 1, side view, about half the natural size. Fig. 1*a*, upper jaw, outer row of conical teeth and inner rows of minute cardiform teeth on sides of jaw, and patch of cardiform teeth on vomer. Fig. 1*b*, teeth of lower jaw. Fig. 1*c*, spine and two rays of second dorsal, to show the row of small scales behind each, natural size. Fig. 1*d*, scale from above lateral line, twice the natural size. Fig. 1*e*, scale of lateral line, twice the natural size. Fig. 1*f*, scale from back of rays of dorsal fin, magnified four diameters. Fig. 1*g*, section of pedicle of tail. Fig. 1*h*, section behind pectoral.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Fishes)



A. Barthelomew del. et lith. Prof. McCoy direxit. Steam. litho. Govt. Printing Office

PLATE 183.

TEMNODON SALTATOR (LIN. SP.).

THE SKIPJACK.

[Genus TEMNODON (CUV.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Family Carangidæ.)

Gen. Char.—Body oblong, moderately compressed; tail without keel or armature; preoperculum striated and serrated at lower edge. Jaws with a row of strong, lancet-shaped cutting teeth in front, and large bands of minute cardiform teeth on the palatine bones, vomer, and tongue. First dorsal fin of seven or eight slender spines with delicate membrane, capable of being hid in a groove at base; second dorsal and anal fins long, triangular, covered with a thick, slightly scaly skin; two minute spines, often hid in skin, in front of base of anal; no finlets; ventrals thoracic; branchiostegals seven; a simple swim-bladder; pyloric appendages numerous; scales moderate, subquadrate, ciliated and granulated posteriorly, with a faintly marked fan of about five rays in front, extending over the operculum and cheeks; the suboperculum, interoperculum, lower part of preoperculum, snout, and round eye bare.]

D. 8 + 1.23; P. 15; V. 1 + 5; A. (0, or 1, or 2) + 1.24; C. $20\frac{2}{2}$; L.l. 85–90 $\frac{5\text{-}8}{17\text{-}20}$.

DESCRIPTION.—Elongate ovate, depth nearly $4\frac{1}{2}$ in total length, including caudal fin; abruptly narrowed behind dorsal and anal fins; head with profile descending with slight convexity; end of maxillary reaching nearly to vertical of posterior margin of eye; lower jaw protruding in front of upper one; preoperculum striated and distinctly serrated on lower edge; operculum with a deep notch, having two, rounded, sub-angular lobes above base of pectoral; first dorsal rounded, fourth ray longest, eighth ray shortest; second dorsal triangular, third ray longest; anal like the second dorsal, and both covered with a thick, slightly scaly skin; the two minute spines in front of anal distinct in some small specimens, scarcely perceptible to the touch in most adults, and only one in some specimens; ventrals slightly behind the pectorals, united at base; caudal of two pointed lobes with a deep angular indentation in the middle. *Teeth:* About eleven on each side of lower jaw and nine on each side of upper jaw of the large teeth, standing about their length apart; a row of very small, simple, conical teeth behind the large ones in front of upper jaw; a large triangular patch of minute cardiform teeth on the vomer, and an elongate patch of similar ones on each palatine bone, and a smaller oblong patch on each side of the base of the tongue. Lateral line nearly coinciding with the line of the back, and at about one-fourth the depth from it, with simple distinct tubes of about ninety scales; scales spinulose and serrated on posterior edge; eight above and twenty below the lateral line. *Colour:* Blackish-grey or lead colour above, with purplish and steel-blue and green reflections in large specimens, brighter blue in young individuals; smooth part of top of head blackish-purple; cheeks and sides of body lighter than back, with the reflections from the scales producing a longitudinally-striped effect; throat and belly pearly-white; pectoral fin with dusky membrane, blackish at base, and with first simple ray black; the spotted rays greyish, speckled with black, membrane dull

yellowish near base, colourless or smoky beyond; first dorsal with the rays blackish, membrane colourless, except at triangular blackish patch in front of the base of each ray; second dorsal dull blackish-olive, minutely crossed with lines of minute black specks; anal like the dorsal but a little lighter; caudal blackish-olive, darkest at upper, lower and posterior margins; iris yellowish. Total length from tip of snout to tip of caudal, 1 ft. 7 in. Proportional measurements to length (taken as 100):— Length of head from snout to end of operculum, $\frac{22}{100}$; from tip of snout to anterior margin of orbit, $\frac{7}{100}$; length of orbit, $\frac{4}{100}$; tip of snout to base of pectoral, $\frac{24}{100}$; length of pectoral, $\frac{13}{100}$; greatest depth of body, $\frac{22}{100}$; greatest thickness of body, $\frac{13}{100}$; tip of snout to base of ventrals, $\frac{25}{100}$; length of ventrals, $\frac{9}{100}$; tip of snout to front of anterior dorsal, $\frac{32}{100}$; greatest height of first dorsal, $\frac{4}{100}$; space between dorsals, $\frac{3}{100}$; length of second dorsal, $\frac{24}{100}$; greatest height, $\frac{9}{100}$; length of caudal at ends, $\frac{18}{100}$; length of caudal in middle, $\frac{8}{100}$; length of anal, $\frac{22}{100}$; greatest height of first branched rays, $\frac{9}{100}$. Number of scales in $\frac{1}{2}$ in. near middle of side, three.

REFERENCES.—= *Gasterosteus saltatrix*, Lin. Syst. Nat., p. 421; = *Chilodipterus heptacanthus*, Lacép 3, p. 542, t. 21, f. 3; = *Temnodon heptacanthus*, Quoy and Gaim. Voy. Freyc., Zool., t. 61, f. 2, p. 400; = *Scomber plumbeus*, Mitchel, L. and P. S. N. York, v. 1, p. 424, t. 4, fig. 1; De Kay, Fish, F., N. York, p. 130, t. 26, f. 81.

This is certainly identical with the "Skipjack" of English-speaking fishermen in Carolina and S. Africa, as well as various parts of Australia, and is the famous "Blue Fish" of the coasts of New York. Like De Kay, several observers have not found the eighth ray spoken of by Cuvier in the first dorsal, probably from looking at the wrong end; it is very minute and behind the last spine. The two minute spines concealed in the skin in front of the anal fin are certainly absent in most specimens but very distinct in young ones, and perhaps may be a sexual character. It is by some oversight, I suppose, that Dr. Günther and Sir W. Macleay in their Catalogues state the scales to be cycloid; they are certainly ctenoid. I only find seven rays to dorsal in most large specimens such as that here figured, not eight as in Günther's and Macleay's works, agreeing thus with Quoy and Gaimard and with De Kay; but in small specimens the eighth may usually be found, as in our figure 3. The row of small conical teeth inside the outer row of large ones in the upper jaw I find constant, but they seem to have been overlooked by most observers, except Quoy and Gaimard and Cuvier and Valenciennes.

One of the commonest of the food fishes supplied to the market of Melbourne from all the neighbouring coasts, usually about a

foot long, but occasionally more than double that size, and I have seen one caught in June, 1888, 3 ft. 2½ in. long. It is moderately good for the table.

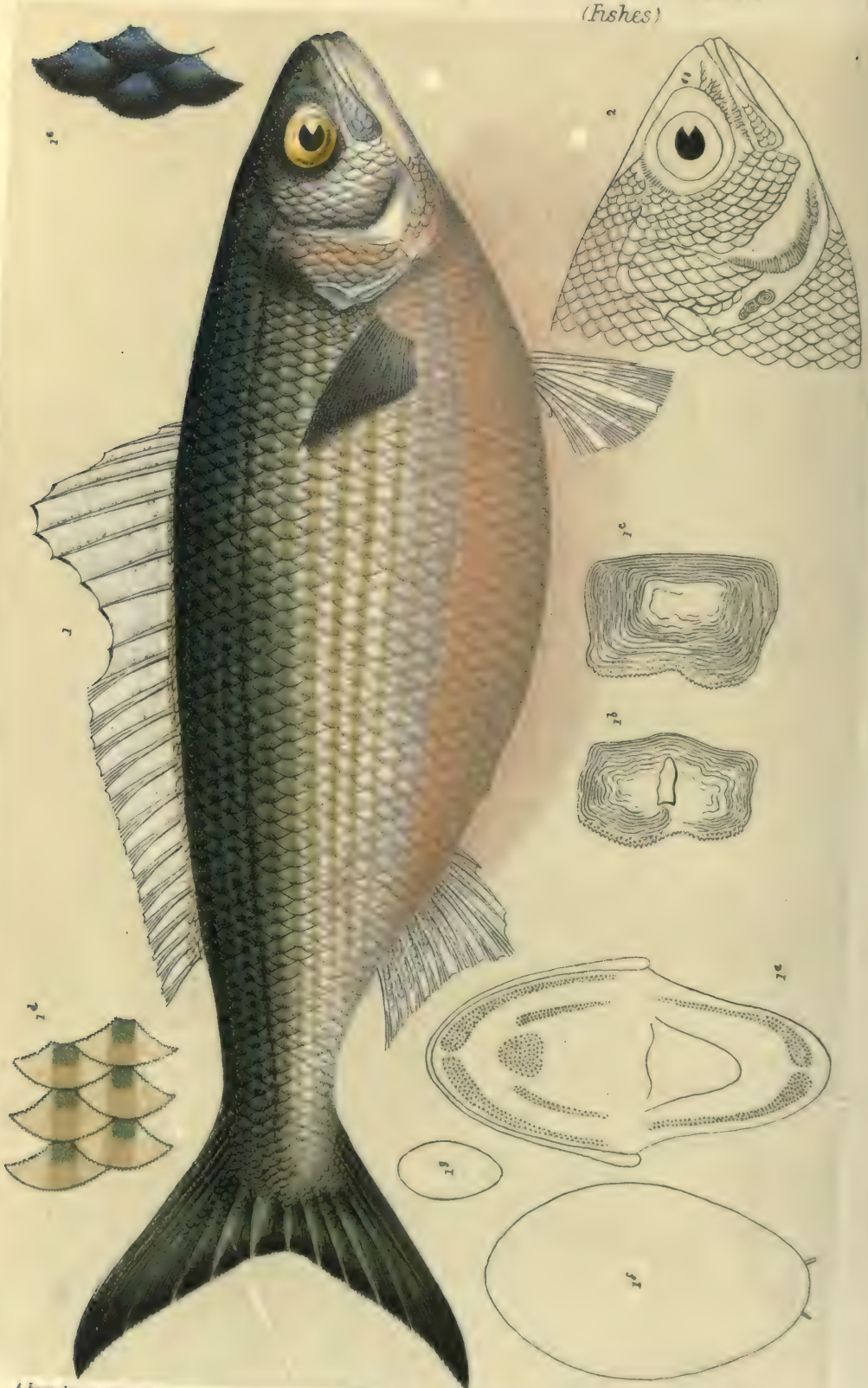
Explanation of Figures.

Plate 183.—Fig. 1, average specimen, half the natural size; eighth dorsal spine is absent. Fig. 1*a*, mouth, natural size, showing outer row of conical teeth, smaller inner row on upper jaw, with cardiform patches on hinder edges of upper jaw, palatine bones, vomer, and base of tongue. Fig. 1*b*, scale, twice the natural size, from below lateral line. Fig. 1*c*, scale from lateral line, twice the natural size. Fig. 1*d*, scale from above lateral line, twice the natural size. Fig. 1*e*, section behind pectoral. Fig. 1*f*, section of pedicle of tail. Fig. 2, anal from another specimen, showing two additional short spines in front. Fig. 3, first dorsal fin, showing eight rays, from another specimen.

Frederick McCoy.

ZOOLOGY OF VICTORIA

(Fishes)



A. Barrickman del et lith.

Prof. M^c Coy direxit

Steam litho Gov^t Printing Office

PLATE 184.

ARRIPIS GEORGIANUS (CUV. AND VAL.).

THE ROUGHY.

[Genus ARRIPIS (JENYNS). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Family Percidæ.)

Gen. Char.—Form moderately elongate, fusiform. Branchiostegal rays seven. Gill openings large. All the teeth villiform; numerous rows of teeth on the palatine bones and on the vomer. Tongue smooth. One dorsal fin, with nine slender spines and several branched rays; anal fin with three spines and several branched rays; caudal fin deeply forked; pectoral small; ventrals a little behind base of pectorals. Operculum with one or two spines at upper posterior edge. Preoperculum denticulated on basal and ascending edge. Infraorbital bone slightly denticulated. Maxillary bone with scales. Scales very finely ciliated at posterior edge; anterior fan of diverging ridges nearly or quite obsolete, replaced by fine close striæ, parallel to the anterior truncated margin. Air-bladder simple. Pyloric appendages numerous. Confined to Australia.]

D. 9.14; A. 3.10; V. 1.5; P. 16; C. 18; L.l. $54\frac{6}{1\frac{1}{2}}$ (seven or eight rows of small scales, beyond those fifty-four of lateral line, on tail).

DESCRIPTION.—General form of the body fusiform, moderately compressed, the curve of the back much less convex than that of the ventral outline. Height of body from 4 (at base of ventrals) to $3\frac{1}{2}$ (at greatest depth, opposite eighth spine) in large, or $4\frac{1}{2}$ in small specimens, in total length, including caudal fin; thickness rather less than half the depth; length of head about 5 to $5\frac{1}{5}$ in total length; diameter of eye about one-quarter the length of head in largest specimens, one-third in small ones. Fourth dorsal spine longest. The two spines of the operculum are very visible in small specimens of the ordinary dimensions of 9 inches, both standing out as smooth angular projections, the lower a little more acute than the upper; but the upper one is scarcely visible in the very large specimen measured below, being in it, and all approaching it in size, broad, longitudinally ridged, and so obtuse as to lose the spine-like character of the young. One to two rows of scales on maxillary bone; lower and ascending edge of preoperculum distinctly serrated in the small specimens, but almost smooth in the very large. Lower edge of suborbital bone from anterior half of lower edge of orbit to snout with coarse sulci extending downwards and backwards, roughly serrating the lower edge, especially in small specimens. Snout short, obtuse; the lower jaw very slightly longer than the upper. Scales very finely serrated on posterior margin; the anterior portion marked with vertical lines of growth, and quite without radiating fan-like ridges. Lateral line about one-quarter of depth of body below dorsal profile. *Colour:* Top of head dark-olive to level of eye, with a paler extension round the eye. Top of snout of both jaws, blackish. Back dark olive-grey with bronze and steel-blue reflections. Sides gradually getting lighter to ventral edge; rather more than one-third of each scale in the longitudinal rows darker and more olive than the lighter greyer interval, forming sixteen or seventeen longitudinal stripes, fainter towards the belly. Cheeks pearly, with bronze reflections on operculum, the upper posterior edge and a spot about middle of anterior edge, darker; throat and maxillary white; iris bronze, yellowish, and green. *Fins:* Light-grey, speckled with black; dorsal and anal flecked with blackish; an imperfect, narrow, blackish edge to dorsal; ventral nearly colourless; caudal darkest, blackish-olive, with the posterior margin and tips black; pectoral dark, but less so than caudal. *Measurements:* Very

P.S.—By a mishap plate 184 has been spoiled at the last moment. The belly of the fish should be white, with a slight pearly-purple tinge. The latter color has been printed full strength, unfortunately, but the reader must suppose it to be absent, like lower part of tail.

large specimen: 1 foot 4 in. 3 lines from snout to tip of caudal fin. Proportional measurements to this length, as 100: length of head, $\frac{20}{100}$; snout to eye, $\frac{6}{100}$; diameter of eye, $\frac{5}{100}$; space between eyes, $\frac{8}{100}$; greatest depth of body, $\frac{23}{100}$; snout to origin of dorsal, $\frac{21}{100}$; length of dorsal, $\frac{40}{100}$; height of fourth spine, $\frac{10}{100}$; length of caudal lobes, $\frac{20}{100}$; ditto in middle, $\frac{6}{100}$; length of pectoral, $\frac{12}{100}$; snout to ventral, $\frac{26}{100}$, snout to anal, $\frac{62}{100}$; length of ventral, $\frac{12}{100}$; length of third anal spine, $\frac{6\frac{1}{2}}{100}$; first anal branched ray, $\frac{7\frac{1}{2}}{100}$; length of base of anal, $\frac{11}{100}$. Average-sized specimen: from snout to tip of caudal fin, 9 in. 3 lines. Proportional measurements to this length, as 100: length of head, $\frac{20}{100}$; snout to eye, $\frac{6}{100}$; diameter of eye, $\frac{6}{100}$; space between eyes, $\frac{7}{100}$; greatest depth of body, $\frac{26}{100}$; snout to origin of dorsal, $\frac{23}{100}$; length of dorsal, $\frac{40}{100}$; height of fourth spine, $\frac{12}{100}$; length of caudal lobes, $\frac{22}{100}$; ditto in middle, $\frac{5}{100}$; length of pectoral, $\frac{13}{100}$; snout to ventral, $\frac{28}{100}$; snout to anal, $\frac{60}{100}$; length of ventral, $\frac{13}{100}$; length of third anal spine, $\frac{6}{100}$; first anal branched ray, $\frac{8}{100}$; length of base of anal, $\frac{12}{100}$.

REFERENCES.—Rich., E. and T., p. 117, t. 54, f. 3 to 6; = *Centropristes Georgianus*, C. and V., Hist. Nat. des Poiss. v. 7., p. 451.

The name Roughy is popularly given in Victoria to this fish from the remarkable roughness to the touch which the serration of the posterior edge of each of the very large scales gives the surface, although it is really as fine as I figure it. It is somewhat like the Skipjack in usual size, shape, and colour, although the two fish may be distinguished at a glance by the continuity of the spinous and branched rays of the dorsal in the Roughy, and the two portions forming distinct fins in the Skipjack, in which also the large teeth of the jaw show the generic difference at once.

The outer rows of teeth are rather smaller than the others in the Roughy or *A. Georgianus.*

The very large specimen figured has (as usual) the head and eye smaller in proportion than in the small, usual size, and in it the two spines on posterior edge of operculum are much less marked, the upper one much broader and divided by ridges, and the serration of the preoperculum obsolete.

Not figured of the colours of life before.

EXPLANATION OF FIGURES.

PLATE 184.—Fig. 1, very large specimen (over 16 inches long), about one-half natural size. Fig. 1*a*, mouth, natural size, showing cardiform teeth on jaws, vomer, and palatine bones, and smooth tongue. Fig. 1*b*, scale from lateral line, magnified two diameters. Fig. 1*c*, scale from below lateral line, magnified two diameters, showing serrated posterior edge, and absence of fan on anterior covered portion. Fig. 1*d*, scales from middle of body, one and a half times the natural size, to show colouring. Fig. 1*e*, scales from nape, twice the natural size, to show colouring. Fig. 1*f*, section behind pectoral. Fig. 1*g*, section of pedicle of tail. Fig. 2, head of smaller specimen (9 inches long), natural size, to show the two distinct spines on operculum at that size.

FREDERICK McCOY.

F. H. Macgillivray del.
J. Ripper lith.

Prof. McCoy direct.

Steam. litho. Govt. Printing Office

PLATE 185, FIG. 1.

AMATHIA BICORNIS (TENISON-WOODS).

[Genus AMATHIA (LAMOUROUX) = SERIALARIA (LAMARCK). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Ctenostomata. Family Vesiculariidæ.)
Gen. Char.—Zoarium radicate, erect or creeping, with free filiform dichotomous branches. Zoœcia sub-tubular, connate, in two parallel rows, continuous or in distinct groups which are placed on one or two sides of the branches or wound spirally, partially or wholly, round them.]

DESCRIPTION.—Zoœcia of moderate height, deeply hollowed above (when dry), with a long hollow process on each side at the summit, arranged in close spiral clusters of about two whirls, the basal clear parts of the internodes being about the same length as the clusters.

REFERENCES.—*Serialaria spiralis*, Tenison-Woods, Trans. Roy. Soc. N. S. Wales, 1877, p. 84; *Amathia bicornis*, Tenison-Woods, Tr. Roy. Soc. Vict., June, 1879.

Port Phillip Heads.

Forms dense masses of a brownish colour, the largest I have being about an inch and a half in each direction. The close double spiral clusters, separated by clear portions of the branches of about the same length, with the peculiar hollow processes from the summits of the zoœcia, are sufficiently distinctive.

EXPLANATION OF FIGURES.

PLATE 185.—Fig. 1, part of specimen, natural size. Fig. 1*a*, small portion of same, magnified. Fig. 2*b*, two zoœcia, more highly magnified.

PLATE 185, FIG. 2.

AMATHIA SPIRALIS (LAMX).

DESCRIPTION.—Zoarium forming large tufts of dichotomously divided branches. Zoœcia very long and narrow, arranged in a continuous spiral round the branches, interrupted only at the bifurcations.

REFERENCE.—Lamouroux, Hist. des Polyp. Corall. Flex., p. 161, pl. iv., fig. 2.

Port Phillip Heads.

This species occurs in tufts several inches in height. The zoœcia form a continuous spiral round the branches, interrupted only at the bifurcations. They are separated by deep grooves, but in dried specimens, as in that figured, they become depressed and the partitions appear as prominent ridges. The united separating walls of contiguous zoœcia project upwards as blunt points (more prominent when dried). It is at once distinguished from the other species by its stoutness, the uniform length of the zoœcia and the closeness of the spiral entirely concealing the branches except at the bifurcations. There can be no doubt that this is Lamouroux's species. That described and figured by Busk as *A. spiralis* in the "*Challenger*" Polyzoa is quite different.

EXPLANATION OF FIGURES.

PLATE 185.—Fig. 2, branch, natural size. Fig. 2*a*, portion of same (dried), magnified.

PLATE 185, FIG. 3.

AMATHIA TORTUOSA (TENISON-WOODS).

DESCRIPTION.—Zoarium slender, straggling, of a dull olive colour; branches clear and glassy. Zoœcia slender, of moderate height, arranged in long spiral clusters extending from two-thirds to more than a complete turn round the axis, and leaving a clear space at the base of the internode.

REFERENCES.—*A. tortuosa*, Tenison-Woods, Tr. Roy. Soc. Vict., 1879. *A. connexa*, Busk, "*Challenger*" Polyzoa, pt. ii., p. 35, pl. vi., fig 3.

Port Phillip Heads; Sealers' Cove, Baron von Mueller.

I believe that this is the species intended by Mr. Woods, although it does not quite agree with his figure and description. Mr. Busk, however, was doubtful as to the identification and named this *A. connexa*, considering another allied species, which he describes and figures, to be the true *A. tortuosa*.

The branches are colourless, very clear, and glassy. The zoœcia are of moderate height, of nearly uniform size, although usually rather shorter distally, and are arranged in an open spiral forming a nearly complete turn. The figure, taken from a dried specimen, does not show the characters so satisfactorily as one preserved in spirit, and I shall therefore give a fresh one when figuring the remaining species of the genus.

EXPLANATION OF FIGURES.

PLATE 185.—Fig. 3, portion of specimen, natural size. Fig. 3*a*, portion of same, magnified.

PLATE 185, FIG. 4.

AMATHIA INARMATA (McG.).

DESCRIPTION.—Zoœcia arranged in unilateral biserial groups of 4–9 pairs, occupying nearly the whole length of the internodes which are slightly arcuate, of moderate height, slightly diminishing towards the distal extremity.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov., 1886.

Port Phillip Heads.

This is considered by Kirkpatrick (Ann. and Mag. Nat. Hist., July, 1888) to be the *A. biseriata* of Krauss. I have not seen Krauss's work (Corallinen und Zoophyten der Sudsee), and therefore cannot say whether this identification is correct. South African specimens, however, which I have received from Dr. Pergens as *A. biseriata* are certainly different.

The extent of internode occupied by the clusters varies, these sometimes extending almost the whole length, at other times a considerable portion at the base being bare.

EXPLANATION OF FIGURES.

PLATE 185.—Fig. 4, portion of specimen, natural size. Fig. 4*a*, part of same, magnified.

PLATE 185, FIG. 5.

AMATHIA AUSTRALIS (TENISON-WOODS).

DESCRIPTION.—Zoœcia arranged in straight unilateral clusters of 5-7 subalternate pairs, of nearly uniform thickness, diminishing in height from the proximal to the distal; the terminal clusters having beyond the distal zoœcia a pair of large, confervoid, and frequently branched processes; a similar process often replacing a branch at a bifurcation.

REFERENCES.—*Serialaria Australis*, Tenison-Woods., Proc. Roy. Soc. N. S. Wales, 1877; *Amathia Australis*, T.-Woods, Tr. Roy. Soc. Vict., 1879.

Port Phillip Heads.

Occurs in loose tufts several inches in height. The zoœcia usually diminish in height from the proximal to the distal, but are occasionally nearly equal throughout the clusters. At a bifurcation one branch is frequently represented by a confervoid filament similar to those at the extremities of the terminal clusters.

This species is probably the *A. cornuta* of Lamouroux. His figure, however, represents the zoœcia as increasing in height from the proximal to the distal, and as there is, therefore, some doubt about the determination, it is better to adopt Mr. Tenison-Woods' name.

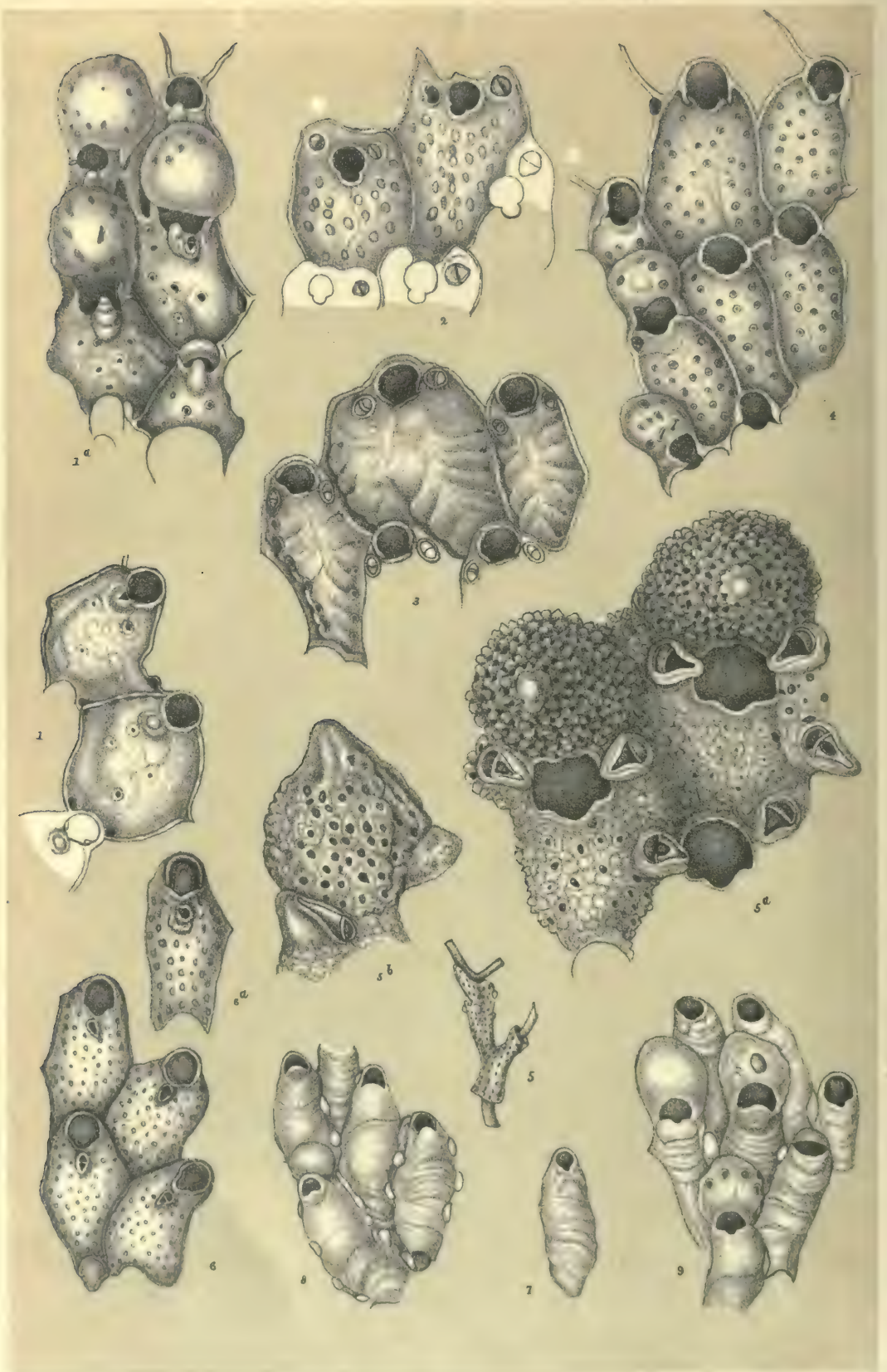
EXPLANATION OF FIGURES.

PLATE 185.—Fig. 5, portion of specimen, natural size. Fig. 5*a*, part of same, magnified.

The specimens and descriptions illustrated by this plate are from Mr. MacGillivray.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA
(Polyzoa)



P.H. Macgillivray del.
J. Ripper lith.

Prof. McCoy direxit.

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PLATE 186, FIG. 1.

SCHIZOPORELLA ROSTRATA (McG.)

[Genus SCHIZOPORELLA (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ).

Gen. Char.—Zoarium encrusting, or erect and foliaceous, or columnar and branched. Zoœcia closely adherent to each other; lower lip with a distinct notch or sinus; no true peristome]

DESCRIPTION.—Zoarium encrusting. Zoœcia rhomboidal, separated by narrow, sharply-raised margins, very slightly convex or nearly flat, silvery, with numerous faintly-bordered pores; mouth with a wide shallow sinus in the lower lip and a minute denticle on each side internally; an elevated process immediately below the lower lip, on the inner aspect of which is an avicularium with the triangular mandible pointed upwards. Oœcia large, globular, surface punctate or obscurely perforated.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Nov., 1886.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

EXPLANATION OF FIGURES.

PLATE 186.—Fig. 1, two young zoœcia. Fig. 1*a*, another portion from same specimen, showing older zoœcia and oœcia.

PLATE 186, FIG. 2.

SCHIZOPORELLA WOOSTERI (McG.).

DESCRIPTION.—Zoœcia broad, subquadrate, separated by distinct raised margins, surface granulated; mouth subcircular, with a wide rounded sinus below. An avicularium, with semicircular mandible, on each side of the mouth at the upper angles of the zoœcia.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July, 1886.

Queenscliff, Mr. Wooster.

EXPLANATION OF FIGURE.

PLATE 186.—Fig. 2, small portion of specimen, magnified.

PLATE 186, FIG. 3.

SCHIZOPORELLA PULCHERRIMA (McG.).

DESCRIPTION.—Zoœcia separated by narrow raised lines, broad and nearly flat, surface hyaline, traversed by faint lines converging from minute pores or depressions at the margins; mouth very wide, edge thickened, contracted towards the base, and the lower lip forming a shallow sinus or nearly straight. A broadly elliptical avicularium placed obliquely on each side of the mouth.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov., 1885.

Port Phillip Heads.

The only specimen I have seen is in the hemeschara form. It is not complete, measures three-eighths of an inch across, and is remarkable for the small amount of calcareous matter, being very thin and translucent.

EXPLANATION OF FIGURE.

PLATE 186.—Fig. 3, portion of specimen, magnified. The middle zoœcium is probably formed by the fusion of two.

PLATE 186, FIG. 4.

SCHIZOPORELLA LATISINUATA (HINCKS).

DESCRIPTION.—Zoarium encrusting. Zoœcia large, broad, separated by raised thickened margins, surface punctate and perforated—when recent, covered by a delicate epitheca; mouth arched above, with a wide notch beneath, not contracted at its opening; edge of mouth slightly thickened. Oœcia large, globose, granular, or perforated, frequently personate.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., Aug., 1882.

Port Phillip Heads.

The form of the mouth in the figured specimen differs somewhat from that given by Mr. Hincks, the sinus in the lower lip being narrower and deeper, and the border of the mouth thinner.

In other specimens, however, it is much shallower and scarcely distinguishable. The separating margins at their junctions with the sides of the mouth occasionally rise to form an acute angle projecting forwards.*

EXPLANATION OF FIGURE.

PLATE 186.—Fig. 4, portion of specimen, magnified.

PLATE 186, FIG. 5.

SCHIZOPORELLA BITURRITA (HINCKS).

DESCRIPTION.—Zoarium thick, encrusting algæ. Zoœcia confused, indistinct, large, oblong; surface granular and perforated; mouth very large, with a deep, wide, rather pointed sinus in the lower lip. A large triangular avicularium on the inner side of a thick calcareous process on either side of the mouth. Oœcia large, conical, surmounted by a thick, prominent umbo; surface strongly granular and perforated.

REFERENCE.—Hincks, Ann. and Mag. Nat. Hist., Oct., 1884.

Port Phillip Heads.

This very peculiar and striking species is readily distinguished. It forms thick, calcareous layers, usually surrounding the stems of small dark algæ. The zoœcia are very indistinct, little prominent except immediately below the mouth. The surface is covered with granulations and pores. The mouth is very large and wide, with a broad sinus in the lower lip. On each side of the mouth is a stout, calcareous process, on the inner aspect of which is a large, triangular avicularium with the mandible pointed upwards. The upper part of this process is mamilliform and nearly smooth, the lower part granular. The oœcia are very large, mamilliform, surmounted by a nearly smooth, blunt umbo; the remainder covered with large granulations and round pores. These granulations and pores are arranged in more or less radiating and concentric series.

EXPLANATION OF FIGURES.

PLATE 186.—Fig. 5, specimen, natural size. Fig. 5*a*, two zoœcia and oœcia, magnified. Fig. 5*b*, oœcium and oral avicularium seen in profile.

*Since the above was printed I have received specimens precisely agreeing with Hincks' figure and description, and differing a good deal in the mouth from those previously examined by me. I will give a figure, with description, in another plate. It may be doubted whether the present should not be considered a distinct species.

PLATE 186, FIG. 6.

SCHIZOPORELLA PACHNOIDES (McG.)

DESCRIPTION.—Zoarium encrusting. Zoœcia elongated, irregular in shape, separated by distinct grooves with an elevated line at the bottom; surface covered with small elevations, or, from the opening of these, white-bordered pores; mouth lofty, horse-shoe shaped, with a wide, deep sinus in the lower lip; margin thickened, especially below; upper border becoming thickened and raised with age. An avicularium, with the triangular mandible pointed straight or obliquely downwards, on a slight elevation below the mouth. Oœcia of moderate size, rounded, finely granular.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Nov., 1886.

Port Phillip Heads.

EXPLANATION OF FIGURES.

PLATE 186.—Fig. 6, group of zoœcia, magnified. Fig. 6*a*, single zoœcium.

PLATE 186, FIGS. 7–9.

SCHIZOPORELLA HYALINA (LINN. SP.).

DESCRIPTION.—Zoarium thin and silvery. Zoœcia in more or less radiating lines, closely united or separated by punctures, elongated, smooth, or transversely rugose; mouth subcircular, lower lip entire or with a sinus. Oœcia large, globose, smooth, vertically carinate, or umbonate, or granular, or perforated.

REFERENCES.—*Schizoporella hyalina*, Hincks, Brit. Mar. Pol., p. 271, pl. xviii., figs. 8–10; pl. xlv., fig. 2. *Lepralia hyalina*, Busk, Brit. Mus. Cat. Mar. Pol. pt. ii., p. 84; pls. lxxxii., xcv., ci.

On algæ, shells, and stones, common.

This cosmopolitan species usually occurs in small circular colonies on algæ or shells. The zoœcia are thin and hyaline, arranged in irregularly radiating lines, either closely united or separated by intervening perforated spaces, the parts between the perforations being hollow or tubular. They are generally much

elongated and transversely rugose. Sometimes, however, they are quite smooth. The mouth varies considerably, being either subcircular and entire or with a sinus in the lower lip. The part immediately below the mouth is frequently produced upwards and forwards into a transverse umbo obscuring the lower lip. The oœcia also vary very much. They are crowded towards the centre of the zoarium where they frequently present somewhat the appearance of a Cellepore. The ovicelligerous zoœcia, as pointed out by Mr Hincks, are mostly small and aborted.

The following varieties have been distinguished :—

Var. α: *cornuta.*—A stout tubular process on each side of the mouth.

Var. β: *incrassata.*—Walls thickened and opaque.

Var. γ: *tuberculata.*—A number of tubercles on the front of the zoœcia, and often a strongly developed umbo below the orifice.

Var. δ: *pellucida.*—Described and figured in Plate 38, fig. 9, of the present work as *Lepralia pellucida.* Zoœcia very thin and pellucid, mouth small and sinuated. Oœcia smooth and carinate.

There is some difference of opinion as to the generic position of the species, it presenting several of the characters of *Chorizopora. Schizoporella,* however, seems to be its proper place.

EXPLANATION OF FIGURES.

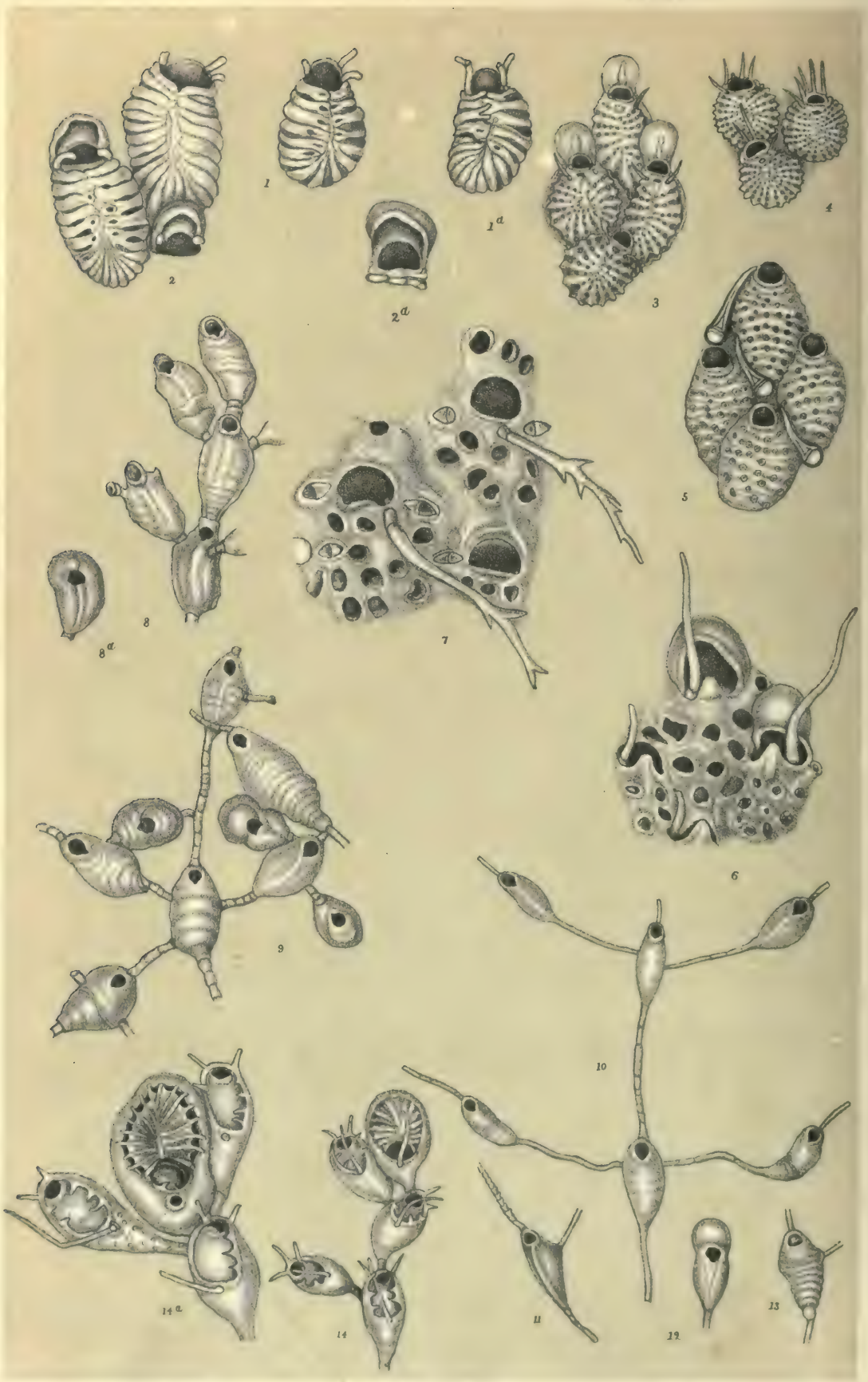
PLATE 186.—Fig. 7, single zoœcium, showing a sinus in the lower lip. Fig. 8, group of zoœcia from another colony. Fig. 9, part of a colony, showing zoœcia with the lower lip entire or sinuated, and oœcia variously smooth, umbonate, and perforate.

I am indebted to my friend Mr. MacGillivray for the specimens and descriptions of the Polyzoa on this plate.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA

(Polyzoa)



F. H. Macgillivray del.
J. Ripper lith.

Prof. McCoy direxit

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PLATE 187, FIGS. 1–3.

MEMBRANIPORELLA DISTANS (McG.).

[Genus MEMBRANIPORELLA (SMITT). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cribrilinidæ.)

Gen. Char.—Zoarium adnate or foliaceous. Zoœcia contiguous or disjunct; front closed by a series of flattened, more or less consolidated, calcareous ribs.]

DESCRIPTION.—Zoœcia contiguous or separated, oval or elongated; ribs 8–11 on each side, a thin raised line down the centre marking the suture of the opposite ribs; mouth with 2–6 thick, articulated spines. Oœcia rounded, with a depressed area separated by a thick margin.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., July, 1882.

Port Phillip Heads; Warrnambool, Mr. H. Watts.

In young specimens the ribs are seen to bifurcate at the inner extremities. At first they are separated by considerable intervals, but, as growth and calcification advance, they become almost contiguous. The oral spines are thick and occasionally almost pod-like, the first pair frequently larger. The oœcium has a large depressed area in front bounded by a thickened ridge. The ovicelligerous cells have one pair of spines. In the first specimen described the zoœcia are separated by considerable distances, but in others they are closely adjunct, although with a tendency to spread at the edges of the zoarium. It is allied to the European *M. nitida*, from which it differs in the stouter spines and, especially, in the structure of the oœcia. There are no avicularia in my specimens.

EXPLANATION OF FIGURES.

PLATE 187.—Figs. 1 and 1*a*, zoœcia from the disjunct form, young. Fig. 2, zoœcia and oœcia from an older and more calcified specimen. Fig. 2*a*, single oœcium.

PLATE 187, FIGS. 3 AND 4.

CRIBRILINA RADIATA (MOLL. SP.).

[Genus CRIBRILINA (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Cribrilinidæ.)

Gen. Char.—Zoarium encrusting, or adnate, or erect. Front of zoœcia with radiating furrows occupied by regular series of perforations, or irregularly pierced by large, more or less rounded foramina; mouth semicircular or subcircular, entire below.]

DESCRIPTION.—Zoarium crustaceous. Zoœcia closely adjunct or slightly separated and connected by an intervening basis, rounded or ovate; front occupied by 6–10 ribs on each side radiating from a smooth or ridged central spot or line, the intervening sulci pierced by a row of small round foramina; a triangular smooth space below the mouth usually bounded by a raised margin and with a small perforation at the lower part; mouth semicircular, with 4–6 spines on the upper margin and frequently a thin setiform spine on each side below the angle. Oœcia globular, smooth, with a vertical ridge or umbo.

REFERENCE.—*C. radiata* (including *innominata*), Hincks, Brit. Marine Polyzoa, p. 185, pl. xxxvi., figs. 1–9.

Port Phillip Heads, on shells and calcareous nodules.

This beautiful species is subject to considerable variation. The zoœcia are usually ovate or nearly round, sometimes they are narrower and produced below, or they may be very broad. The centre is usually raised into a ridge or keel, terminating above in an umbo; sometimes, however, it is smooth. The aperture in the triangular smooth space below the mouth is by no means constant and the bounding ridge is frequently absent, as are also the setiform spines. The extent and prominence of the oœcial ridge varies. Avicularia are rarely (in Australian specimens) developed between the zoœcia.

There is no doubt that Mr. Hincks is right in uniting *C. radiata* and *innominata*.

EXPLANATION OF FIGURES.

PLATE 187.—Fig. 3, small group of zoœcia, with the ribs very prominent and showing the setiform spines. Fig. 4, three zoœcia, from another specimen, slightly separated from each other.

PLATE 187, FIG. 5.

CRIBRILINA SETIROSTRIS (McG.).

DESCRIPTION.—Zoarium crustaceous. Zoœcia distinct, elongated, surface with numerous round or pyriform foramina, frequently arranged in irregular single or double transverse rows; mouth arched above, straight below, margin thickened and

frequently produced into a sharp point at the centre of the lower lip. An avicularium at the base of the zoœcium, with a very long setiform mandible directed up one side of the cell.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., Oct., 1882.

Port Phillip Heads.

This species may be at once recognised by the peculiar avicularia with the long setiform mandibles.

EXPLANATION OF FIGURE.

PLATE 187.—Fig. 5, group of zoœcia. In all the lower lip is smooth, but the peristome is very frequently produced into a short, sharp, central process.

PLATE 187, FIG. 6.

CRIBRILINA MONOCEROS (BUSK).

DESCRIPTION.—Zoarium adherent or hemescharine. Zoœcia with large foramina, the margins of which are thickened; mouth large, the peristome of the lower lip raised into a central pointed process; occasionally two or three thin and furcate spines on the upper margin of the mouth; a thick oral spine on one side of the mouth, within the peristome. Oœcia subimmersed, smooth, or with slight radiating ridges, and frequently with two or more avicularia on elevations. Avicularia absent, or numerous and very variable; in some specimens scattered and usually close to the sides of the zoœcia, with sharp or blunt mandibles; in others very large, with large acute or spatulate mandibles; they are also found sessile on eminences round the mouth, and one occasionally surmounts the mucronate elevation of the lower lip.

REFERENCES.—Busk, Brit. Mus. Cat., Mar. Pol. pt. ii., p. 72, pl. xciii., figs. 5, 6; MacGillivray, Prd. Zool. Vict., pl. xxxv.

Port Phillip Heads; Portland, Mr. Maplestone; Warrnambool, Mr. Watts.

Two distinct species seem to have been confounded under this name, and I therefore give an amended description and an additional figure of the true *C. monoceros*—that of Busk in the British Museum Catalogue and myself in this work.

EXPLANATION OF FIGURE.

PLATE 187.—Fig. 6, zoœcia and oœcia, showing the intra-peristomial spine.

PLATE 187, FIG. 7.

CRIBRILINA ACANTHOCEROS (McG.).

DESCRIPTION.—Zoarium adherent. Zoœcia with large foramina; mouth large, lower lip straight, without mucro; a large spine, very long, and with sharp secondary spines or prickles directed upwards, immediately below the lip and to one side. Oœcia subimmersed, usually with a small mitriform smooth space below, and several large perforations round the upper margin. Frequently a large avicularium, with triangular mandible, at each side of the mouth towards the angle.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., July, 1886.

Port Phillip Heads; Portland, Mr. Maplestone.

This differs from *C. monoceros* in the following points:—The lower lip is straight and the peristome is not developed into a mucro; the oœcium is somewhat different; and especially the situation of the azygos oral spine is different. In *C. monoceros* it is always situated at one side of the mouth, close to the margin above the angle and is enclosed within the peristome when that is developed. In *C. acanthoceros* the spine, besides being very long and furnished with the peculiar armature, is situated *below* the lower lip, and if a peristome should be developed, which I have never seen, would be outside it.

EXPLANATION OF FIGURE.

PLATE 187.—Fig. 7, two zoœcia, showing oral spines and avicularia.

PLATE 187, FIGS. 8 AND 9.

HIPPOTHOA DIVARICATA (BUSK).

[Genus HIPPOTHOA (LAMOUROUX). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ.)

Gen. Char.—Zoarium adnate. Zoœcia distant, connected by creeping tubes so as to form linear series, or partly clustered in small patches; mouth with a sinus in the lower lip.]

DESCRIPTION.—Zoœcia connected by short thick tubes, pyriform, usually carinate, smooth or finely striated, or transversely annulated or corrugated; mouth with a slight notch in the lower lip. Oœcium surmounting a zoœcium, rounded, smooth, or slightly carinate, or with a rounded umbo.

References.—*H. divaricata*, Busk, Brit. Mus. Cat. Mar. Pol., pt. i., p. 30, pl. xviii., figs. 3, 4; Hincks, Brit. Mar. Pol., p. 288, pl. xliv., figs. 1–4; and pl. i., fig. 2; *H. patagonica*, Busk, Brit. Mus. Cat. Mar. Pol., pt. i., p. 30, pl. xvii., fig. 1.

Hobson's Bay and Port Phillip Heads, on algæ, shells, and zoophytes. Usually occurs in slender, silvery, dendritic colonies, the zoœcia being connected by short, rather thick fibres, originating from the summits or sides of the zoœcia in irregular numbers (usually one or two) and occasionally branching from other tubes. The tubes or fibres are smooth or annulated. Their length varies very much, being sometimes considerably longer than the zoœcia, at other times short and scarcely apparent, the result being in the so-called variety *conferta* almost as close an aggregation as in a *Lepralia*, but with a tendency to branch off at the edges. The mouth is expanded above, narrowed below, and has usually a shallow sinus in the lower lip. The oœcium is round or globular, the zoœcium which it surmounts usually smaller than the normal, and frequently originating directly from the side of another. The oœcium also frequently has a round boss or umbo in front. The roughly annulated form is Busk's *H. patagonica*.

Explanation of Figures.

Plate 187.—Fig. 8, portion of a specimen with the zoœcia transversely striated and carinate. Fig. 8*a*, zoœcium and oœcium from the same. Fig. 9, portion of another specimen, with zoœcia mostly annulated and those bearing oœcia arising from the sides of ordinary zoœcia, connecting fibres of considerable length.

Plate 187, Figs. 10–13.

HIPPOTHOA DISTANS (McG.).

Description.—Zoœcia connected by very long, slender threads, small, elongated, smooth, finely striated, or faintly annulated; anterior surface rounded or carinate; mouth subcircular, or wider above and narrowing downwards into a shallow sinus, peristome distinctly thickened. Oœcia globular, terminal, smooth, or umbonate.

References.—*H. distans*, P. H. MacGillivray, Tr. Roy. Soc. Vict., 1868; *H. flagellum*, Hincks, Brit. Mar. Pol., p. 293, pl. xliv., figs. 5—7; Busk, Chall. Pol., pt. i., p. 4, pl. xxxiii., fig. 7.

Hobson's Bay and Port Phillip Heads, on algæ shells and zoophytes, probably common in other localities also. Differs from *H. divaricata* in the zoœcia being much smaller and narrower and the connecting tubes being very long and slender. The zoœcia are usually much elongated, narrow, and smooth, or very faintly striated, and are frequently carinate. The anterior extremity of the zoœcium sometimes projects slightly forwards. The mouth is small, narrowed below into an inconspicuous sinus and has a narrow peristome. In addition to the fibres from the end, very frequently one arises from each side of a zoœcium.

This species and *H. divaricata* are very closely allied, differing chiefly in the zoœcia of the present species being much smaller, narrower, and more elongated, and in the connecting tubes being very long and thin. The oœcium is similar to that of *H. divaricata*, except that it is smaller.

There can be no doubt that *H. flagellum* of Manzoni, Hincks in British Marine Polyzoa, and Busk in the "*Challenger*" Polyzoa, is the same as the present species, an identification which has already been made by Hincks. Both Hincks and Busk describe and figure the zoœcia as smooth and destitute of carina, but in Manzoni's figure of *H. flagellum* they are distinctly carinate.

EXPLANATION OF FIGURES.

PLATE 187.—Fig. 10, portion of specimen on shell. Figs. 11, 12, and 13, zoœcia from another specimen on an alga. One zoœcium is very sharply carinate, another strongly annulate, whilst the ovicelligerous one is nearly smooth.

PLATE 187, FIG. 14.

ELECTRA AMPLECTENS (HINCKS SP.).

[Genus ELECTRA (LAMOUROUX). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Membraniporidæ.)

Gen. Char.—Zoarium encrusting, or filiform and erect, or foliaceous. Zoœcia elongated, narrow below, closely adherent together, lower part convex; area oval or rounded, occupying the whole width of the zoœcium above, deep, with thickened margins; one or more large, whip-like spines (occasionally replaced by an avicularium) below the margin of the area, and a variable number of short, sharp spines on its circumference.]

DESCRIPTION.—Zoarium encrusting. Zoœcia arranged in single, bifurcating series, pyriform, with smooth surface; aperture oval, occupying more than half the front of the zoœcium and with a slightly thickened margin, covered with a thin membrane; two thin spines above at the upper extremity of the zoœcium and two, or usually three, short, sharp spines on each side of the aperture; a long, flexible spine immediately below the lower edge of the aperture. Oœcia situated above a zoœcium at the bifurcation of a branch, oval, the front surface covered by a series of slender, converging ribs connected by a thin membrane and bounded by a narrow calcareous line, beyond which is a smooth part.

REFERENCE.—*Membranipora amplectens*, Hincks, Ann. and Mag. Nat. Hist., Aug., 1881.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

I have only seen one not very good specimen on a piece of alga, covered also with *Schizoporella hyalina*. It is allied to *E. pilosa*, but is very much smaller. The oœcium is very peculiar. The front wall is covered by a series of slender, white ribs converging to a short line in the lower part. The ribs are bounded externally by a narrow calcareous rim and are connected by a thin membrane which is frequently slightly deficient at the margin. Beyond the ribbed part is a narrow smooth portion.

EXPLANATION OF FIGURES.

PLATE 187.—Fig. 14, small portion of a specimen. The zoœcium of the commencing branch at one side of the bifurcation below the oœcium is deficient. Fig. 14*a*, another portion of the same specimen, showing three zoœcia and an oœcium, more highly magnified to show the structure of the latter.

Mr. MacGillivray has contributed the specimens and descriptions for this plate.

FREDERICK MCCOY.

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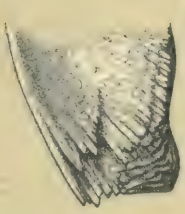

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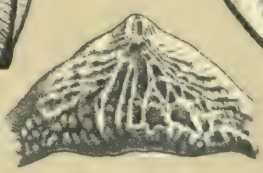

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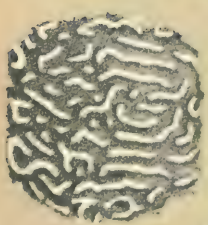

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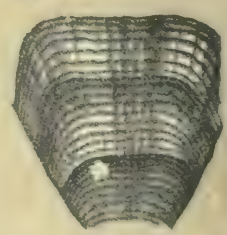

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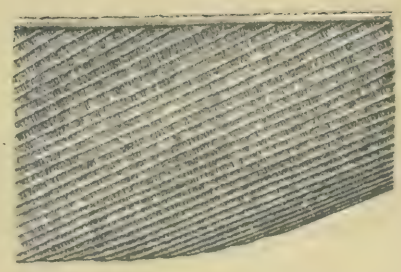

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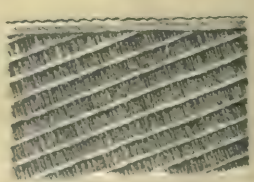

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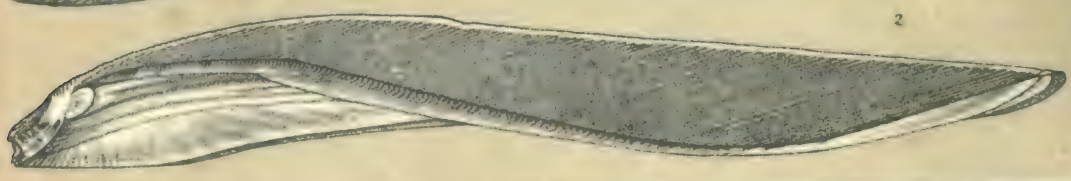

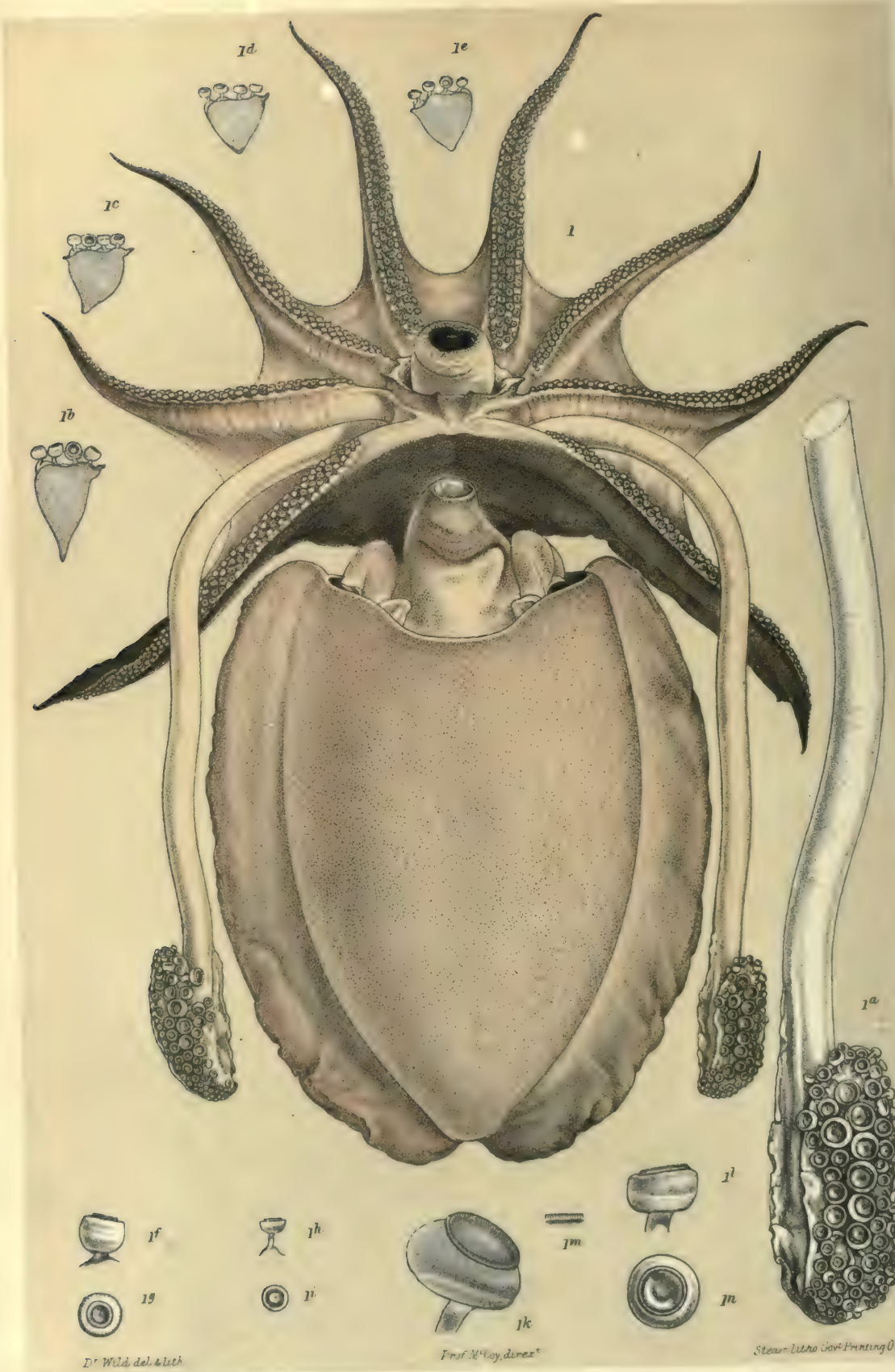

Dr Wild. del. & lith.

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PLATES 188, 189, AND 190.

SEPIA APAMA (GRAY).

THE LARGE MELBOURNE SEPIA OR CUTTLE-FISH.

[Genus SEPIA (Lin., restricted). (Sub-kingdom Mollusca. Class Cephalopoda. Sub-class Antepedia. Order Sephinia. Family Sepiadæ.)

Gen. Char.—Body short, ovate or oblong, depressed, obtusely rounded behind; front dorsal edge of mantle with rounded angular projection forwards; fins narrow, along whole length of sides of body, disconnected behind. Ventral inner surface of mantle with an oblique oblong tubercle fitting corresponding hollow in sides of siphon; cervical part, under front edge of internal shell, with longitudinal central ridge fitting into groove on back. Head very large, wider than long, without crests or cervical plaits. Eyes very large, lateral, with thick prominent under-eyelid; a lachrymal opening in front of folds of eyelid. Ear opening behind lower part of globe of eye; no auricular ridges; buccal openings six, between bases of arms and lips; buccal membrane with seven lobes, the two ventral smaller. Sessile arms short, strong; third and fourth with crests or membranous fins on back. Sucker cups in four rows, subequal, minutely fringed or toothed, spheroidal, obliquely pedunculated; protecting membranes of cups very short; a web between bases of arms, nearly obsolete between bases of ventral pair. Tentacular arms long, slender, retractile, with large terminal club, having an external fin and several rows of suckers, the horny rings of which are convex in middle of outer face, contracted above and below, and upper edge usually divided into minute, blunt, fringe-like teeth. Siphon large, with large internal valve, without suspensory band of attachment to head. Internal shell calcareous, depressed, thick, oblong or oval, as long as back of mantle in which it is imbedded; back convex, hard, rugose, with horny thin edge, and acute, often spinose, posterior end; concave underface filled with very oblique, cellular, calcareous layers, sometimes with posterior, small, simple, conical cavity behind; no siphuncle.]

DESCRIPTION.—Body thick, fleshy, moderately convex on back, more so on ventral side, smooth, broad-ovate, narrowed behind. Lateral fins rising a little above the edge of mantle anteriorly, rounded at posterior end, leaving a small, angular, obtusely-rounded notch or space with slightly convex, intervening portion of body at posterior end. Sessile arms short, strong, moderately thick; order of length—4, 3, 2 = 1, or 4, 2 = 1, 3, or 4, 3 = 2 = 1; each with four rows of subequal suckers, the compressed horny rim of each of which is set with very numerous, compressed, truncated, fringe-like, short teeth; fin between arms about one-third of their length to upper pairs of arms, and about half the length of ventral pair between them and next pair, but nearly obsolete between the bases of two ventral arms. Two tentacular arms reaching about twice the length of the club beyond end of body; club dilated abruptly, auriculate, extended inwards when reflexed (outwards when directed forwards), and obtusely plicated transversely on back, with a short narrow fin on outer (when turned back, inner when turned forward) straight edge; five rows of suckers, three outer rows smallest, inner row larger and median rows largest, all with numerous, minute, truncated, fringe-like teeth on compressed horny edge; seven or eight very large cups (counted in the longitudinal direction), with about three smaller at base and five at apex of same row. Head large, transversely oblong, a little less than opening of mantle; eyes very large, with very thick underlid; a group of three to five caruncles over each eye, and two or three smaller ones below, behind middle; anterior dorsal edge of mantle broadly semioval; ventral moderately concave. Buccal membrane with seven lobes, one point between bases of dorsal arms, one on each side over bases of next pairs of arms, one on each side between bases of next pair of arms (or over base

of tentacular arms), one on each side of base of ventral arms; lips with numerous small wattles; beak sharp, black. *Colour:* Dark-purple on back and upper surface of head, paler at sides and base of fins, the narrow outer edges of which are darker; lower or ventral side paler; tentacular arms and inner face of sessile arms whitish. *Measurements:* Length from anterior dorsal edge of mantle to interval between fins behind, 8 inches; from ventral edge of ditto, 6 in. 7 lines; width of fins at middle, about 1 in.; width of body without fins, about middle, 4½ in.; length of tentacular arms, 11 in. 6 lines; length of suckered club, 1 in. 9 lines; width of club, including 3 lines of inner fin, 1 in.; length of inner fin, 2 in. 9 lines; longest (ventral fourth) sessile arm, 6 in. 9 lines; next (third) pair, 5 in. 6 to 8 (on two sides) lines; next (second) pair, 5 in. 8 lines; dorsal (first) pair, 5 in. 8 lines; depth of fin between dorsal pair; 1 in. 8 lines; next pair, 1 in. 6 lines; next pair, 2 in.; next pair, 2 in. 7 lines; ventral pair, 2 lines. Width of head, 3 in. 6 lines; longitudinal diameter of eye, 2 in. Taking length of dorsal surface of mantle as 100: the proportional length from ventral edge is $\frac{82}{100}$; width of fins at middle, $\frac{13}{100}$; greatest width of body without fin, $\frac{57}{100}$; length of suckered club of tentacular arms, $\frac{22}{100}$; width of club, including outer fin, $\frac{13}{100}$; longest sessile (fourth ventral) arm, $\frac{84}{100}$; next (third) pair, $\frac{70}{100}$; next (second) pair, $\frac{71}{100}$; dorsal, $\frac{71}{100}$. Another specimen gives length of ventral arms to dorsal length of mantle as $\frac{98}{100}$ (suckered portion, $\frac{30}{100}$); next pair, $\frac{72}{100}$. *Internal Shell:* Elongate-ovate, semioval anteriorly, narrower posteriorly, with slight concavity of sides about one-third from posterior end; anterior two-thirds of midline of back nearly straight, posterior third with a gentle parabolic curve downwards to edge; spine thick, very short, curved downwards or towards ventral edge, not reaching beyond margin of shell; below spine a triangular space, twice as wide as deep, filled with irregular, lacunose, spiny projections of lamellæ, edges radiating from under base of spine; a middle space of upper surface rather more than one-third the width in front, rather less than one-eighth the width at one-fourth the length from posterior edge, convex; separated from lateral, slightly convex-shaped sides by two shallow, diverging impressions, disappearing at posterior fourth of length; middle of posterior fourth of length covered with coarse, irregular, short, vermicular, tubercular ridges, the sides with striæ arching forwards and outwards. Margins brown and horny at edge, calcareous further in, narrow in front and at sides of anterior half, becoming wider and forming steep sides posteriorly, united behind; a thick pad at posterior edge of hollow on ventral surface, the portion of which marked with transverse undulating lines of cellular growth is about four-sixths of total marginal length, flattened behind, slightly concave in middle, and convex at sides on front half; anterior two-sixths showing greatest convexity or depth of the shell at its posterior edge. Length from anterior to posterior edge, 5 in. 10 lines; greatest width (a little in front of middle), 2 in. 5 lines, or $\frac{40}{100}$; greatest depth, 7 lines, or $\frac{10\frac{1}{2}}{100}$; length of spine, 1½ lines, or $\frac{2}{100}$; adult shell about 11 in. long, rather wider behind the lateral concavities, and without spine, which is often absent in much smaller specimens (probably old dwarfs). Sixteen sutural spaces in 6 lines near middle of underside of shell.

REFERENCE.—Cat. Mol. B.M., Ceph. Ant. p. 103.

This is the largest and commonest species of *Sepia* on our coasts, and its internal dorsal shell or "Cuttle-fish Bone" is abundant on the shores everywhere in the Colony, although it has not been figured before. I think the character of the relative order of successive length of the sessile arms is not so satisfactory

as might be supposed from its frequent use by authors, owing to the fact that in this species the right and left of one pair sometimes vary 3 lines or more in examples as large as that figured (half the natural size); so that some measurements would show three pairs of arms equal in the present species. The nearest ally of this cuttle-fish is the *Sepia latimanus* (Quoy and Gaim.) (including the *Sepia Rappiana* of Feruss.) in size, general shape, form of club, and colour, but differs in the short blunt spine of shell and corresponding slight convexity of posterior middle part of body between the fins, which, in that species, is acuminate or projects in a long acute point, in accordance with the long acute spine of posterior end of the shell; the shell of *S. apama* is also proportionately wider than that of *S. latimanus*. The proportional greatest width to length from anterior to posterior margin is $\frac{29}{100}$ in D'Orbigny's figure, although said to be 31 in the text; it is sensibly narrower than the bone of *S. apama*, the proportional width of which is $\frac{40}{100}$.

Explanation of Figures.

Plate 188.—Fig. 1, internal bone or shell, dorsal view, of large specimen, two-thirds of natural size. Fig. 1*a*, ditto, viewed from ventral aspect. Fig. 1*b*, profile view. Fig. 1*c*, triangular space beneath posterior spine, magnified two diameters. Fig. 1*d*, posterior end, viewed from side, magnified two diameters. Fig. 1*e*, vermicular ridging of posterior portion of dorsal surface, magnified two diameters. Fig. 1*f*, portion of sutural lines of cell growth from ventral surface, magnified two diameters. Fig. 2, vertical section of smaller specimen, two-thirds the natural size, to show relation of cell growths to transverse sutural lines on middle and posterior portion of ventral surface. Fig. 2*a*, posterior end of ditto, magnified, showing the pad and form of obsolete decurved spine. Fig. 2*b*, portion of cell structure, more highly magnified, showing the parallelism of the layers (on the right hand), with the smooth, anterior, ventral surface, and their cutting that surface (on the left hand) to form the undulating, transverse, imbricating striæ of the middle and posterior portions of the ventral surface. Fig. 2*c*, portion of the same, magnified four diameters.

Plate 189.—Fig. 1, animal, soft external portion, one-half the natural size, viewed from the ventral side, showing siphon with the "buttons" for attachment of mantle to head, inner side of arms, with their suckers and connecting membranes; buccal membrane and mouth with the black beaks (the long, retractile, tentacular arms are not extended to their full length). Fig. 1*a*, club of one of the long tentacular arms, showing the suckers and fin on opposite side, natural size. Fig. 1*b*, section of ventral pair of arms, natural size, showing small fin at inner edge of suckers, and the great compression of the back to form its broad fin. Fig. 1*c*, next pair of arms, showing smaller dorsal fin in section, natural size. Fig. 1*d*, ditto, next pair of arms. Fig. 1*e*, ditto, dorsal pair. Fig. 1*h*, small cup on margin of club, magnified two diameters, viewed sideways. Fig. 1*i*, same, viewed from above. Fig. 1*f*, side view of average-sized cup on smaller arms, magnified two diameters. Fig. 1*g*, same, viewed from above. Fig. 1*k*, largest cup on club, viewed from side, magnified three diameters, to show fringing of horny ring. Fig. 1*l*, profile view of ditto, magnified two diameters. Fig. 1*m*, portion of toothed edge of ditto, magnified five diameters. Fig. 1*n*, same, viewed from above.

Plate 190.—Fig. 1, same cuttle-fish, dorsal view, one-half natural size, showing the large eyes, with caruncles above. Fig. 1*a*, portion of club, to show radiated outer side and broad fin on back, natural size. Fig. 1*b*, buccal membrane and beaks, one-half natural size.

Frederick McCoy.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XIX.

BY

FREDERICK McCOY, C.M.G., M.A., Sc. D. Cantab., F.R.S.,

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PREFACE.

The first plate in this Nineteenth Decade represents one of the most curious of the small Lizards of the Colony, remarkable for the entire absence of external ear-drums, the *Tympanocryptis lineata.*

The second plate figures for the first time the natural colours of life of one of the largest of the so-called Whiting, amongst our best food fishes, the *Sillago ciliata.*

The third plate represents the Skipjack of all English-speaking fishermen, the *Temnodon saltator*, remarkable for its almost world-wide distribution, and which is common in our Bay and fish shops most months of the year.

The fourth plate represents, for the first time of the natural colours, another of our very common food fishes, popularly called Roughy, the *Arripis Georgianus.*

The next three plates are devoted to illustrations of Mr. MacGillivray's contributions of specimens to the Museum, and descriptions of our Victorian Polyzoa.

Plate 188 represents the so-called Cuttle-fish bone of our commonest species of *Sepia*, not, however, figured before, the *Sepia apama.*

And the last two plates represent, of the colours of life, the details of the soft parts of the Cuttle-fish from which the bone, figured on plate 188, was extracted, also unfigured before.

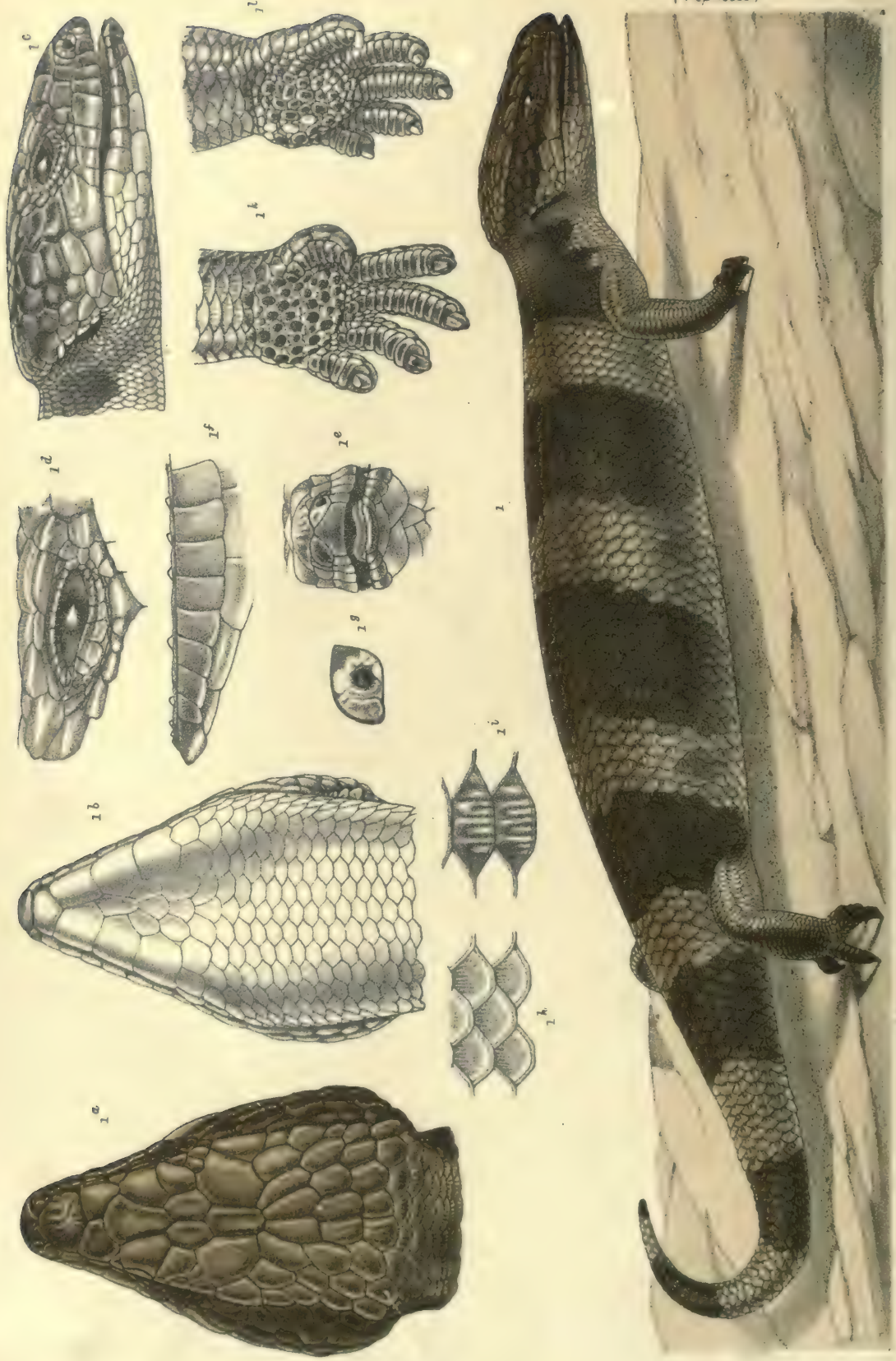
The succeeding Decades will illustrate as many different genera as possible, and deal first, usually, with species of some special interest, and of which good figures do not exist, or are not easily accessible.

FREDERICK McCOY.

2nd July, 1889.

ZOOLOGY OF VICTORIA

(Reptiles)



D.r J. J. Wild del. et lith.

Prof. Mc Coy direxit

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PLATE 191, FIG. 1.

HINULIA WHITEI (LACÉP. SP.).

WHITE'S HINULIA LIZARD.

[Genus HINULIA (GRAY):<LYGOSOMA (DUM. and BIB.). (Sub-kingdom Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosaura. Family Scincidæ.)

Gen. Char.—Body fusiform, tail rounded, tapering. Head subquadrate, obtusely pointed in front; rostral erect, triangular or hexagonal from truncation of the angles; nostril in middle of nasal plate, without posterior groove; no supranasal plates; frontal oblong, hexagonal; palate toothless, with deep triangular notch; fronto-parietal plates two, separate; lower eyelid covered with scales; ears small, lobed in front. Limbs moderate; five simple, compressed toes on each foot; heel of hind foot bordered with rows of conical granules. Scales smooth, thin; two middle preanal ones, usually larger than the adjoining ones.]

DESCRIPTION.—Profile of head flat from hind margin to hind edge of eye, thence abruptly arched to obtuse snout; no groove behind nostril, but a slight vertical groove from it to lower edge of nasal plate; rostral hexagonal, vertical apex touching prefrontal or internasal plate separating the nasals; prefrontal transversely rhombic, wider than long, about equalling rostral in length, touching first of a row of four frenal plates by each lateral angle; fronto-nasals hexagonal, slightly shorter than prefrontal, the two hinder edges of which they join, meeting in the middle, separating the prefrontal by half its length from the frontal; frontal quadrangular, obtuse-angled in front, tapering to a point behind, not twice as long as wide, a little longer than the fronto-parietals; parietals and interparietal of moderate size; four occipital plates, the inner pair larger than the outer one, on each side, behind the parietals; fifth and parts of fourth and sixth labials below eye; three large temporals; six supraoculars, third largest; eight to ten superciliary plates; four loreal plates. Ear-opening a little smaller than eye. Scales of side a little smaller than those of back and belly, forty round middle of body, smooth, those of belly with three faint longitudinal striæ; central preanal scales not perceptibly larger than the others. Limbs moderate, with slender toes, the hinder part of sole studded with blunt conical tubercles. *Colour*: Very pale yellowish-brown above and on underside of tail and legs; sides and belly bluish from side of head to base of tail; edges of eyelids and lobes on front edge of ear pure white; nape with five broad, black, and six whitish, longitudinal stripes; the middle black one disappears over the shoulder, letting the two next whitish stripes coalesce to form a broad, distinct, light stripe down middle of back; the two next black stripes on each side coalesce to form two broad, very conspicuous, longitudinal stripes, one on each side of midline of back, the intervening light streak on each side of nape continued as a row of round or kidney-shaped, light, very conspicuous spots in middle of broad black stripes (sometimes double, and sometimes breaking into a short row of two or three small spots); the black bands of the back are continued on the tail as rows of irregular black spots, first seven, then, about halfway, three, and disappearing towards end of tail; a broad, distinct, whitish band, like median dorsal one, on each side bounding the black one; and outside this on each side the marking is very variable, always a bluish-grey ground, with black markings either irregular marbling or defining one or two rows of rounded light spots; chin, lips, and cheeks whitish with a few irregular, longitudinal dark markings on cheek, lips, and temple, and occasional

spots and dark edges to head plates; upper side of limbs with interrupted dark longitudinal dashes, or occasionally with round light spots irregularly edged with dark. *Measurements* of rather small specimen figured:—Total length, 6 inches; tail, 3 in. 3 lines; length of head, 6½ lines; width of head, 5 lines; width of middle of body, 5 lines; tip of snout to axil of fore limb, 1 inch; axil to front base of hind limb, 1 in. 5 lines; length of fore limb to tip of longest finger, 8 lines; length of hind limb to tip of longest toe, 11½ lines; diameter of orbit, 1½ lines.

REFERENCE.—=*Scincus Whitii*, Lacépede, An. Mus., v. 4, p. 192; Quoy and Gaim, Uranie, t. 42, f. 2; = *Hinulia id.*, Gray Zool. E. and T. Rept.; = *Tiliqua leucopsis*, Gray An. N. H. 1838, p. 291; = *Lygosoma molinigera*, Dum. and Bib. Erpt., v. 5, p. 736.

This is one of the most elegantly marked, but most variable of the small Lizards common in Victoria. The two white spotted broad, black, longitudinal stripes on the back are the most constant of the markings, but the markings of the sides vary greatly, sometimes presenting two or three rows of round whitish spots, margined irregularly with black; more commonly the sides show only a number of black spots of very irregular size and shape. I have seen one specimen with four irregular rows of white, black-edged spots on each side of the dorsal pair, and extending faintly on to the throat. The two pairs of occipital or nuchal plates are sometimes united into one pair, occupying the same space.

This Lizard, like other species of *Hinulia*, does not climb trees or bushes like the so-called Bloodsucker (*Grammatophora*), but keeps on the ground under logs and stones, darting rapidly through the herbage when disturbed.

The specimen figured is rather less than the average size. From Prahran, near Melbourne. It occasionally reaches a length of 1 ft. 2 in.

EXPLANATION OF FIGURES.

PLATE 191.—Fig. 1, rather small specimen, natural size. Fig. 1*a*, top of head, to show form of cephalic plates, magnified two diameters (fronto-parietals irregularly divided into two on one side and three on the other). Fig. 1*b*, underside, to show chin plates and abdominal scales, magnified two diameters. Fig. 1*c*, side view of head to eardrum, magnified two diameters. Fig. 1*d*, front view of head, showing form of rostral and adjacent plates. Fig. 1*e*, eye, magnified four diameters, showing scaly lower eyelid and superciliary plates. Fig 1*f*, underside of hind foot, to show conical tubercles of sole or palm, magnified two diameters. Fig. 1*g*, underside of anterior foot, showing tubercles of sole or palm, magnified two diameters. Fig. 1*h*, preanal scales, magnified two diameters. Fig. 1*i*, abdominal scales, to show faint striæ, magnified two diameters. Fig. 1*k*, portion of back, to show distribution of colouring on median light stripe, and two broad dark ones, magnified two diameters.

PLATE 191, FIG. 2.

HINULIA QUOYI (DUM. AND BIB.).

QUOY'S HINULIA LIZARD.

DESCRIPTION.—Moderately slender; back broad, flattened; head broad, triangular, obtusely pointed; tail compressed in middle portion, rounded above and below. *Head plates:* Nostril near lower edge of nasal, with slight indication of vertical sulcus, not meeting above; rostral hexagonal, moderate, curved round obtusely rounded tip of snout, joining prefrontal or internasal by moderately broad suture, separating nasals; prefrontal broader than long, scarcely touching anterior acute angle of frontal; frenonasals just touching by points of inner angles, or nearly so; frontal quadrangular, acute-angled in front, posterior end very acute-angled, long, narrow to hind apex, lateral sides touching the first, second, and part of third supraoculars, as long as fronto-parietals and interparietal taken together; fourth supraoculars large, with a very small fifth posterior one; nine supraciliaries, the sixth and seventh largest; three large temporal plates on each outer side of parietals; a row of three pairs of nuchal or occipital plates, longer than wide, inner pair largest; parietals very large, sometimes touching behind end of interparietal; seven upper labials, sixth and seventh largest, fifth and sixth under the eye; five loreals; ear-opening nearly as large as eye, with very slight indication of four lobules within anterior edge, smaller than adjacent scales. Legs rather long; longest hind toe, if drawn up to side of body and fore leg drawn down, reaches to wrist of fore leg; from tip of snout to shoulder about once and a half in space from axil of arm to groin on front edge of hind limbs. Tail about twice as long as head and body (too short, from re-growth, in specimen figured). *Scales:* Forty round middle of body, ventral scales smooth and slightly larger than the dorsal ones, which are very faintly marked with three or five longitudinal striæ; scales of sides much smaller than those of upper or undersides. Three pairs of large preanal scales, longer than wide, middle much largest. Toes compressed, subdigital plates divided by longitudinal grooves, twenty-four under longest or fourth toe. *Colour:* Pale greenish olive-brown on upper surface; underside and end of tail yellowish-white; sides pale greyish-blue; a broad band along each side at turn of back of irregular, vertical, broad, dark-brown streaks, with zig-zag edges and irregularly connected; upper side of limbs with numerous, irregular, transverse, zig-zag, dark-brown markings; middle of back, top of head, and sides of tail with a few small, quadrate, dark-brown specks; sometimes a few dark specks on throat and belly, occasionally but rarely forming lines of dark spots from throat to preanal scales. *Measurements:* Length of head, 8 lines; width of head, 6 lines; length of head and body from tip of snout to end of preanal scales, 2 in. 8 lines; width of middle of body, 6 lines; length of anterior limb, 8 lines; length of posterior limb, 1 in. 1 line.

REFERENCES.—=*Lygosoma Quoyi*, Dum. and Bib., Erpt. v. 5, p. 728; =*Hinulia gastrosticta*, Günther, Ereb. and Ter. Rept., p. 11; Quoy and Gaim., Voy. Urainie, Zool., t. 42, fig. 1.

This is a much broader Lizard, with wider back, than the *H. tenuis* or *H. elegans*, and has more numerous rows of scales round the middle of the body.

It has the same habits as the *Hinulia Whitei*, running rapidly through the scanty herbage, and hiding under logs and stones. The specimen figured is from the Dandenong Ranges, near Melbourne; common near Sunbury.

EXPLANATION OF FIGURES.

PLATE 191.—Fig. 2, rather small specimen, natural size (tail re-grown, shorter than proper length). Fig. 2*a*, top of head, magnified two diameters. Fig. 2*b*, side view of head and neck, showing plates and slight trace of anterior lobules inside anterior edge of ear. Fig. 2*c*, throat, magnified two diameters, showing large gular plates. Fig. 2*d*, front view of head, magnified two diameters. Fig. 2*e*, eye, magnified four diameters, showing supra-oculars, superciliaries, scaly lower eyelid, and upper labials, in relation to eye. Fig. 2*f*, preanal scales and abdominal and subcaudal scales, magnified two diameters. Fig. 2*g*, dorsal scales, magnified two diameters. Fig. 2*h*, lower side of fore foot, magnified two diameters. Fig. 2*i*, lower side of hind foot, magnified two diameters, to show granules on sole and subdigital scales.

FREDERICK McCOY.

ZOOLOGY OF VICTORIA
(Fishes)

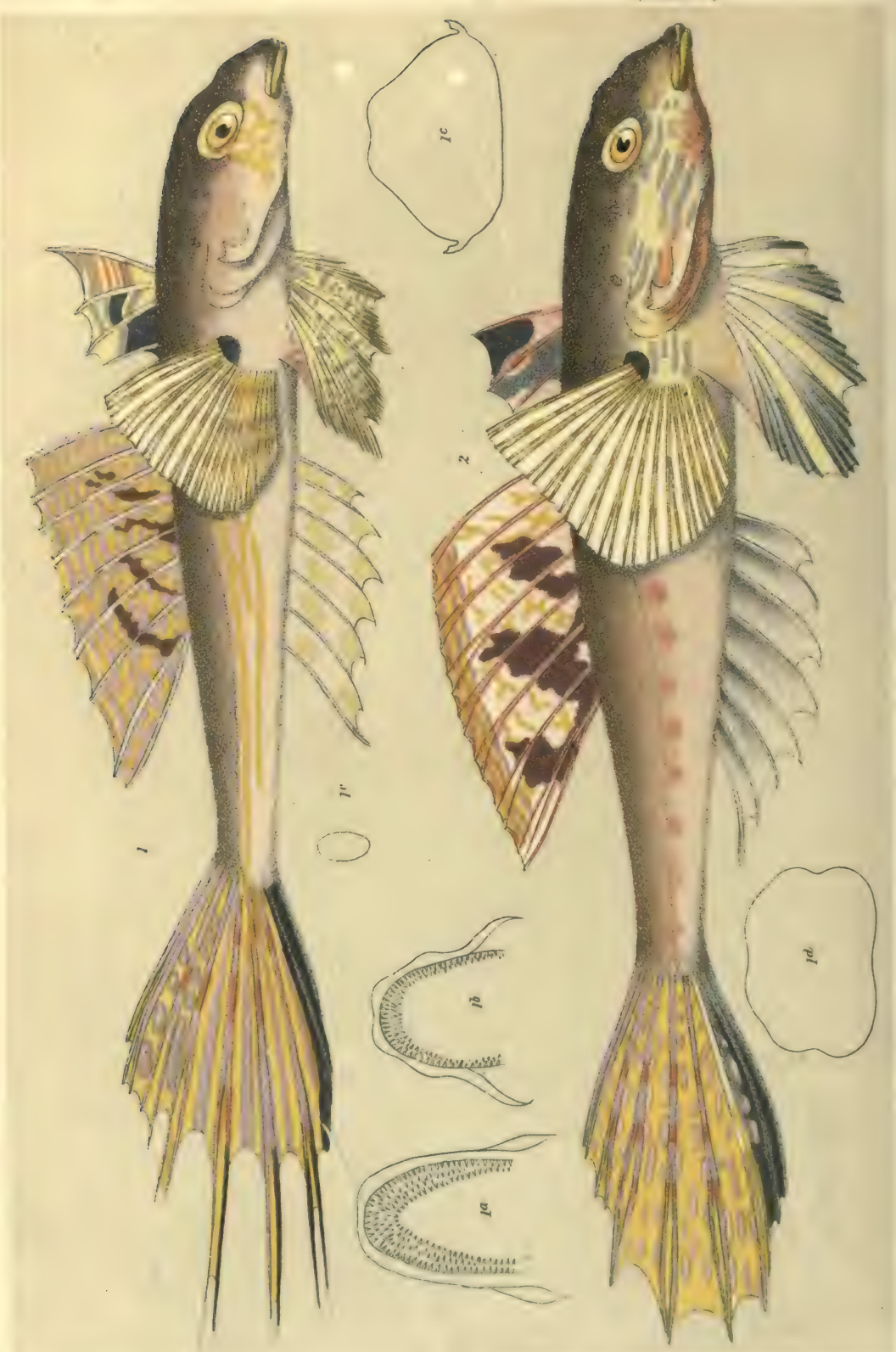

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PLATE 192.

CALLIONYMUS CALAUROPOMUS (RICH.).

THE CROOK-SPINED DRAGONET.

[Genus CALLIONYMUS (LIN.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Family Gobiidæ.)

Gen. Char.—Head trigonal, depressed, cleft of mouth narrow, nearly horizontal, upper jaw very protractile; eyes moderate, high on sides of head, directed outwards and upwards; teeth small, forming villiform patches on premaxillaries and lower jaws, none on palate nor vomer; a very large cylindrical spine extending from angle of preoperculum. Anterior part of body depressed, middle and hinder part usually moderately compressed. Skin smooth, without conspicuous scales. Dorsal fins two, anterior small, with three or four flexible spines. Ventrals large, very wide apart, of one spine and five many-branched rays. Gill-opening very small, usually reduced to an oval hole at upper edge of operculum. Branchiostegals six. No air-bladder. Pseudobranchiæ. A slit behind fourth gill.]

D. 4 + 8; A. 7; C. 10; P. 20; V. 1 + 5. L.l. 232.

DESCRIPTION.—Head broad, trigonal, compressed in front of the eye, with the profile very tumid and arching rapidly from middle of eye to edge of upper lip, the cleft of the mouth being horizontal when closed, but directed forwards and downwards when protruded. Orbits ovate, longer than wide, wider behind than in front, and deeply notching the forehead; the space between the eyes half the longitudinal diameter of orbit. Cheeks behind and below the eyes very tumid, arching outwards abruptly from the compressed rostral portion, and extending with lower edge of preoperculum into the very long preopercular spine, which is bifid at the rounded posterior end; the posterior spine directed upwards, the other hooked forwards and upwards. Operculum depressed, with a narrow, rounded posterior lobe, above which is the large, oval, branchial opening, about half the vertical diameter of the eye in length. Body broader than deep; sides very tumid but arching on upper side downwards into a deep wide sulcus, in which the dorsal fin is placed, and similarly arching on under side upwards into a wide, deep channel, in which the anal fin is lodged. A longitudinal narrow depression along the middle of sides. Wide space between pectorals and ventrals flat. First dorsal of four spines; the first about one-third longer than the second; second and third nearly equal; fourth a little shorter than the third; first branched ray one-third longer than the first spinous ray. Pectoral rhombic, obtusely pointed a little below middle, where the rays are longest. Caudal large, ovate, with the four middle rays prolonged to double the length of the others; the two branches of each uniting beyond the membrane into a single filament. In the young males figured these four rays are shorter, according to age, and in the female their branches are not united into prolonged filaments, but the posterior edge of the caudal fin is broadly rounded. *Teeth:* Minute, sharp-pointed, in several rows on jaws. Lateral line crossing the nape a little in front of the gill-openings, round which on each side it curves downwards abruptly to about level of middle of gill-opening; thence arches with slight, irregular undulations to the hollow midline of sides under about the eighth branched ray of dorsal; and bifurcating at the base of caudal fin, one branch running along the fifth and another along the sixth ray. *Skin:* Naked, glossy,

without scales, conical papilla in front of anal opening large. *Colour:* MALE: Back and snout pale greenish-brown, faintly mottled with pale pink; sides of head pale purplish-carmine, with narrow branching lines of yellow; sides of body from lateral line paler carmine than sides of head, with a few longitudinal narrow yellow lines; a dark-purplish blotch at base of pectoral. Pectoral with nearly colourless membrane, yellowish above, and upper rays yellow and reddish-purple, spotted. First dorsal with orange-red rays and two large dark-purple blotches on membrane behind second and third rays; membrane behind first ray yellowish-orange. Second dorsal with rays and membrane clouded irregularly with greenish-yellow and purple, and, near the edge, with peach-blossom pink, and yellow longitudinal lines. Caudal with upper rays brown; membrane pale greenish-yellow with definite, narrow, longitudinal lines of bright peach-blossom colour; lower one or two rays and membrane dark purplish-slate colour; a few oval spots of opaline bluish-purple at base of tail. Pectoral fin with posterior rays and membrane variegated with pinkish-purple and yellow, the purple becoming dark purplish-slate colour near edge and on front two rays and membrane. Anal pale purplish slate grey. Underside of body pale purplish-white. Iris greenish-bronze. FEMALE: dull bronzy-brown above, passing into whitish on belly, throat, and lower part of cheeks, the white and brown joining by an irregular mottling or network of the dark colour enclosing spaces of the lighter along the sides of body and cheeks. First dorsal usually purplish, with a few pale pink spots on the rays. Ventrals pale brown, with purplish membranes towards margin. Pectorals nearly colourless, with brownish rays. Second dorsal and anal irregularly clouded with blackish-purple; the rays and membrane otherwise yellowish. Caudal brownish, with lighter rays, and a dark blackish-purple patch formed by the membranes of the three lower spaces. *Measurements:* Length of rather large specimen from tip of snout to base of caudal, 8 in. 3 lines. Proportional measurements to this, as 100: Tip of snout to anterior edge of orbit, $\frac{11}{100}$; to posterior edge of orbit, $\frac{18}{100}$; to tip of preopercular spine, $\frac{31}{100}$; to posterior lobed edge of operculum, $\frac{33}{100}$; to anterior edge of gill-opening, $\frac{29}{100}$; to base of pectoral, $\frac{36}{100}$; to base of ventral, $\frac{25}{100}$; to first spine of dorsal, $\frac{30}{100}$; to first dorsal branched ray, $\frac{46}{100}$; to last ray of dorsal, $\frac{70}{100}$; to first ray of anal, $\frac{48}{100}$; length of middle elongate rays of caudal, $\frac{60}{100}$; lateral rays of caudal, $\frac{24}{100}$; longest pectoral ray, $\frac{20}{100}$; longest ventral ray, $\frac{28}{100}$; first spine of dorsal, $\frac{12}{100}$; first branched ray of dorsal, $\frac{20}{100}$; greatest width of head at base of preopercular spine, $\frac{23}{100}$; depth of head at same point, $\frac{25}{100}$; depth of body about middle of length, under sixth branched ray of dorsal, $\frac{12}{100}$; thickness, $\frac{16}{100}$.

REFERENCE.—Er. and Ter., Fish, t. 7, f. 4 and 5, p. 10.

This extremely beautiful species of *Callionymus*, or Dragonet, as such fishes are called in England, is very variable in the brilliant colouring of the male; the dull-coloured female being more uniform and devoid of the brilliant tints of the male. The female is easily distinguished by the dullness of the colouring and the simple rounded posterior edge of the caudal fin, wanting the extreme elongation of the fourth, fifth, sixth, and seventh rays, which in the old males are so conspicuous by the union of the branches into simple extended filaments. The anal papilla is very short and inconspicuous in the female. The elongation of the

anterior dorsal spines is not a marked sexual distinction in this species, and I feel sure that Dr. Günther's suggestion that this species may be the female of *C. altevelis* (Schlegel), of Japan, is not correct. Our two figures are of immature males, intermediate in elongation of the middle caudal rays between the adult male described and the female. Not very uncommon in Hobson's Bay. Not figured of the colours of life before.

EXPLANATION OF FIGURES.

PLATE 192.—Fig. 1, young male, two-thirds natural size. Fig. 1*a*, lower jaw and teeth, twice the natural size. Fig. 1*b*, upper jaw and teeth, twice the natural size. Fig. 1*c*, section of body in front of ventrals. Fig. 1*d*, section of body behind dorsal. Fig. 1*e*, section of end of pedicle of tail. Fig. 2, younger male.

FREDERICK MCCOY.

J. Barthelmew del. & lith.

Steam Lithotint Printing Off.

PLATE 193.

NEOSEBASTES SCORPÆNOIDES (GUICH.).

THE SPOTTED RED GURNET-PERCH.

[Genus NEOSEBASTES (GUICHENOT). (Sub-kingdom Vetebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Family Scorpænidæ.)

Gen. Char.—Resembling *Sebastes*, but no scales on vertical fins, and having lower rays of pectoral branched and not elongated. Head large, spinous, and tuberculated, but less so than in *Scorpæna;* head and body entirely covered with rough scales; no fleshy filaments from head. One dorsal; seven branchiostegal rays. Teeth in villiform bands on jaw, vomer, and palatines.]

D. 13 + 8*; A. 3 + 5; V. 1 + 5; P. 22; C. 15$\frac{4}{6}$. L.l. 48$\frac{8}{34}$ under third dorsal spine; $\frac{9}{25}$ about middle of body under eighth dorsal spine.

DESCRIPTION.—*Form:* Ovate, moderately elongate and compressed, profile of head sloping rapidly from second spine of dorsal (corresponding to the greatest depth) to snout, broken by the projection of nearly one-third the diameter of the very large oval eye; the ocular projections slope to a very deep, smooth channel between the eyes. Gape slightly oblique; lower jaw slightly projecting in front of upper when mouth closed, with a conspicuous knob under its symphysis, and a large rounded pore on each side. Nostrils large; a strong spine near inner margin of anterior one. Superciliary ridge with three, gradually increasing, compressed spines, the posterior one largest. A slight, transverse, smooth furrow behind the eyes. One long, ridge-like, compressed spine, increasing in height to posterior end on each side of nape, beginning in line with posterior edge of orbit; a similar spine, compressed, ridge-like, with two posterior points on stay from edge of orbit to edge of preoperculum; two similar, compressed, spinous ridges in one line, each with two compressed spinous points, near posterior end, extending from anterior fourth of orbit longitudinally nearly to edge of preoperculum on suborbital; one-fifth the diameter of the orbit below its edge. Preoperculum extending in a large compressed spine, continuing its angle near to edge of operculum a little above base of pectoral; a smaller sharp spine below; and three broad, triangular, lobe-like spines at equidistant intervals extended to its lower edge. Operculum with a strong, ridged spine extending upwards and backwards along upper arched edge; a second, longer, ridged spine in a line from middle of eye, directed backwards, nearly reaching edge of operculum. The lachrymal bone or preorbital at lower edge has a broad, trisulcate, three-pointed spine in front overlapping the intermaxillary bone, and four sharp, conical spines behind directed downwards and backwards at upper edge of maxillary. Greatest depth between second and third spines of dorsal, equal to about one-third the length of the body without the caudal fin; thickness of the body about two-thirds the depth; length of the head about two and two-thirds in total length, excluding caudal fin; length of head about one-sixth more than the depth of the body; profile of back sloping with slight convexity to end of dorsal, moderately constricted thence to caudal fin; ventral profile more convex to origin of anal,

* It is, no doubt, by slip of the pen that M. Guichenot puts 18 as the number of soft rays in the dorsal.

thence tapering in nearly straight line to base of caudal fin. Orbit very large, a little less than one-third the length of the head, and slightly less than its own diameter from tip of snout; space between middle of orbits less than the diameter of orbit. Upper edge of dorsal moderately arched for the first five spines, sloping straightly thence to the twelfth; thirteenth on front part of branched rays, double the length of the twelfth, half the length of the following branched ray; first spine of dorsal slightly sigmoid, two-thirds the length of the second, the third being longest. *Pectoral:* Upper rays longest, reaching to base of anal; lower rays branched, the lowest one nearly or quite simple, border of fin convex posteriorly, base under third dorsal spine. *Scales:* Moderate, rounded, covering the whole of the head (except the interorbital groove and a small similar one in front of dorsal and transverse sulcus behind eyes) to tip of snout, very rough to the touch, strongly ctenoid on posterior, semicircular margin, and covered with minute, spinulose granules. Lateral line arched and one-eighth of depth from dorsal edge from origin to about under eighth dorsal spine, thence nearly straight to middle of caudal; about one-fourth the depth from dorsal edge about middle of body. Total length from tip of snout to end of caudal fin of large specimen, 10 in. 6 lines. Proportional measurements to this, as 100: Tip of snout to front edge of orbit, $\frac{7}{100}$; diameter of orbit, $\frac{8}{100}$; to end of maxillary, $\frac{12}{100}$; to end of preopercular spine, $\frac{24}{100}$; to posterior edge of operculum, $\frac{30}{100}$; to upper base of pectoral, $\frac{26}{100}$; to base of first dorsal spine, $\frac{25}{100}$; to base of first branched dorsal spine, $\frac{58}{100}$; to first anal spine, $\frac{54}{100}$; length of second branched ray of dorsal, $\frac{15}{100}$; depth of body, $\frac{27}{100}$; thickness, $\frac{20}{100}$; length of first dorsal spine, $\frac{11}{100}$; of second, $\frac{19}{100}$; of third, $\frac{23}{100}$; length of pectoral, $\frac{26}{100}$; length of caudal fin, $\frac{20}{100}$; first anal spine, $\frac{7}{100}$; second anal spine, $\frac{11}{100}$; third anal spine, $\frac{10}{100}$; second branched ray, $\frac{19}{100}$. Six scales in six lines at middle of body. *Colour:* Upper part of back and head rich purplish, fading into white on lower edge of belly, with several obscure, longitudinal rows of large, roundish, indefinite, rosy-red spots. Cheeks and lower part of head bright red; pectorals greenish in some, yellowish in others, with a dark, purplish posterior margin. Six or seven concentric rows of red spots on rays with occasionally darker spots between them on membranes. Ventrals with rays red, membrane very pale purplish. Spinous portion of dorsal with the membrane obliquely streaked with pale purplish and obscure, scattered, irregular cloudy spots; branched portion of dorsal with greenish membrane and five or six transverse rows of red spots on rays. Caudal fin with basal half yellowish on membrane, but distal half dark purplish, with a narrow, lighter, posterior edge, the rays transversely banded with six or seven rows of dull red spots. Anal with nearly colourless, purplish membrane and irregular spots on the reddish rays. Iris yellow, with red imperfect circles.

Reference.—Guichenot, Mem. de la Soc. Impér. des Sc. Nat. de Cherbourg, v. 13 (2nd ser., v. 3), p. 83.

This very common fish in the Melbourne markets in winter is confounded by fishermen and dealers with the Banded Red Gurnet-Perch *(Sebastes percoides)*—(figured on our plate 33, of the Fourth Decade)—under the name of Red Gurnet. It is easily distinguished by wanting the vertical or transverse dark bands, and even generically by the lower rays of the pectoral fins being branched like the others, while in the *Sebastes* several of the lower rays are unbranched and extended beyond the membrane.

Now figured for the first time, although so abundant on our coasts and in the markets.

EXPLANATION OF FIGURES.

PLATE 193.—Fig. 1, average specimen, about two-thirds natural size. Fig. 1*a*, upper view of head, about two-thirds the natural size. Fig. 1*b*, teeth of upper jaw, vomer, and palate, natural size. Fig. 1*c*, teeth of lower jaw, natural size. Fig. 1*d*, scale above lateral line, magnified three diameters. Fig. 1*e*, scale of lateral line, magnified three diameters. Fig. 1*f*, section at base of pectoral. Fig. 1*g*, section of pedicle of tail.

FREDERICK MCCOY.

A Bartholomew del. lith.

Prof. McCoy, direx.

Steam Litho Govt Printing Office

PLATE 194.

TRACHINOPS CAUDIMACULATUS (McCOY).

THE BLOTCH-TAILED TRACHINOPS.

[Genus TRACHINOPS (GÜNTH.). (Sub-kingdom Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Family Nandidæ. Sub-family Plesiopina.)

Gen. Char.—Body oblong, moderately compressed; mouth obtusely rounded, not protractile; none of the plates of the head serrated. Teeth on jaws, vomer, and palatine bones. Tongue smooth; scales of moderate size, rounded, ctenoid at margin,* lateral line interrupted near end of dorsal fin. Dorsal and anal fins long; fourteen spines in dorsal, three in anal; ventral fins thoracic, with one spine and four branched rays, not elongate; caudal fin pointed, with the middle rays prolonged in filaments. Five branchiostegals; gills three and a half; pseudobranchiæ; gill-membrane not united below the throat; pyloric appendages few. Australia.]

D. 14 + 17; A. 3 + 16; P. 16; V. 1 + 4; C. 24; L.l. 45 + 12.

DESCRIPTION.—Oblong, narrow, moderately compressed; length of head slightly greater than the depth of the body, and slightly more than four times in total length, excluding caudal fin; the depth of the body diminishes little till beyond the dorsal and anal fins, greatest depth near end of pectoral fin about one-fifth of total length, excluding caudal; interorbital space convex, smooth, without scales, less than diameter of orbit, with a few rows of large, prominent pores; snout obtuse, about one-half diameter of orbit; cleft of mouth wide, oblique; maxillary extending a little beyond middle of eye; lower jaw slightly longer than upper one. Teeth small, pointed along the jaws, three or four larger than the rest on each side near the front; two rows forming a long patch on each palate bone, and two rows forming a short, transverse, arched patch on the vomer, nearly joining ends of palatine patches. Gill-openings wide. Scales on cheeks and operculum moderate, those on nape between anterior ends of lateral lines and over lateral line at base of dorsal very small. Lateral line is in two disconnected portions, one of forty-five tubular scales, rising from head to close below dorsal, extending to the thirty-fifth row of scales, where that fin ends; the posterior portion of twelve similar scales occupies the middle of the sides of the tail on the twelve posterior rows of scales; three rows of scales having both the overlapping portions of the interrupted lateral line. Scales of body of moderate size, rounded, finely serrated at posterior edge; along lateral line about forty-seven, two small scales above and seventeen large below it at vertical of base of pectoral. *Fins:* Pectoral fin of sixteen branched rays, oval, about one-fifth shorter than head. Ventral of one spine and four branched rays, about one-fifth shorter than the pectoral, a little in front of which it arises. Dorsal of fourteen spines and seventeen jointed rays, low to end of spinous portion, then higher to near the end which is rounded by a shortening of the three last rays; greatest depth of soft dorsal a little less than depth of body at base; spinous portion rather less than half the depth of body at base. Anal fin of three spines and sixteen soft rays, not so deep as soft dorsal. Caudal of twenty-four rays, angularly pointed behind, the three middle rays extending as filaments one-quarter longer than the rest of the fin. *Colour:* Back dark-brown, becoming lighter and purplish on sides; scales minutely dotted with black; a large, blackish blotch at base of tail, from which five or six middle rays

* See remarks further on.

carry the blackish colour through the middle of the fin to the two extended filaments; the rest of the fin and the soft dorsal pale orange; anterior part of dorsal, anal, pectoral, and ventral, as well as throat and belly, whitish; iris silver bluish-white. Length from snout to base of caudal (excluding fin) 2 in. 1 line; proportional length of head, $\frac{26}{100}$; length of snout, $\frac{5}{100}$; diameter of orbit, $\frac{9}{100}$; interorbital space, $\frac{8}{100}$; length of pectoral, $\frac{20}{100}$; ventrals, $\frac{18}{100}$; snout to origin of dorsal, $\frac{28}{100}$; to end of dorsal, $\frac{85}{100}$; length of caudal, without filaments, $\frac{25}{100}$; filaments, $\frac{9}{100}$; greatest depth of body about middle, $\frac{20}{100}$; depth of tail, $\frac{12}{100}$; thickness of middle of body, $\frac{9}{100}$.

This little fish created a great sensation by appearing in large numbers about the middle of October, 1884, at the piers at Williamstown, in Hobson's Bay, and, being reported to the Commissioner of Customs as the young of the Californian Salmon, were sent to me as an important matter to be determined. Even the Acanthopterygious character of the dorsal fin, one might have supposed, would have prevented any one acquainted with fish from confounding this with any sort of Salmon. The Inspectors of Fisheries and others dealing officially with the fishes of our waters are greatly retarded in their business for want of recognisable figures of most of the native sorts, many of which, like the present species, have never been figured. The illustrations of the natural colours of the living fishes which I expect to present in these Decades will, I hope, diminish the difficulty of recognising them in future, and enable observations on habits, migrations, and times and places of breeding of the different sorts to be attributed correctly to the definitely-named and classified species.

This is the second species of *Trachinops* known, and is easily distinguished from the Sydney *T. tæniatus* (Günth.) by the darkness of the back, without the light longitudinal band of that species; which also has much more prolonged central filaments of the caudal fin, a much lower dorsal fin, and more numerous scales along the lateral line than in the present one. The lateral line rises from the upper end of the gill-opening to the anterior end of the dorsal; the triangular space on nape between these deflected ends of the two lateral lines being covered with very much smaller scales than those of the body; the lateral line, of strongly keeled tubular scales, runs along the base of the dorsal fin, separated from it by two rows only of the minute scales such as are above their anterior ends on the nape.

Dr. Günther in establishing the genus *Trachinops* for the Sydney *T. tæniatus* gives "scales cycloid" as one of the generic characters; but Prof. Kner describing the same species (Reise der Novara Zool., Theil, Fische, p. 216) says, "Die Schuppen sind von mässiger Grösse, weich, und am ganzen Vorderrumpfe glattrandig, gegen den Schwanz aber zeigen sie den Bau ctenoider Schuppen, am festsitzenden Ende einen Fächer von 10–12 Radien und gegen das freie Ende concentrische Furchen und ein feines Netz mit sich bildenden Kurtzen Spitzen in mehreren Reihen, die am freien Rande zu längern wimpern-ähnlich Zähnchen werden," and these remarks apply so well, as far as the hinder portion of the body goes, that I have altered the generic character for both species to "scales ctenoid." In the present species, I think all the large scales are ctenoid.

Found occasionally in abundance about the piers in Hobson's Bay. Not figured before.

EXPLANATION OF FIGURE.

PLATE 194.—Fig. 1, side view, natural size, of adult specimen, of the natural colours. Fig. 1*a*, same, magnified three diameters (upper part of lateral line at base of dorsal somewhat obscured by the shading). Fig. 1*b*, top of head, magnified four diameters, to show scaleless interorbital portion, with large pores, and small scales on nape, and midline of back between ends of anterior portions of lateral line. Fig. 1*c*, side view of head, magnified four diameters, showing the relations of scales, pores, and origin of lateral line. Fig. 1*d*, teeth of upper and lower jaws, vomer and palatine bones, and smooth tongue, magnified six diameters. Fig. 1*e*, side view of teeth of jaws, showing the increased size of some of them near the anterior end, magnified six diameters. Fig. 1*f*, isthmus, lower jaws, gill-rays, and pseudobranchiæ, magnified three diameters. Fig. 1*g*, portion of gills, side view, magnified seven diameters. Fig. 1*h*, front view of head, showing convexity of interorbital space, magnified four diameters. Fig. 1*i*. section of body behind base of pectorals, magnified three diameters. Fig. 1*k*, section of pedicle of tail, magnified three diameters. Fig. 1*l*, scale from upper lateral line, magnified six diameters. Fig. 1*m*, scale from middle of body, magnified six diameters. Fig. 1*n*, scale from nape of neck, magnified six diameters.

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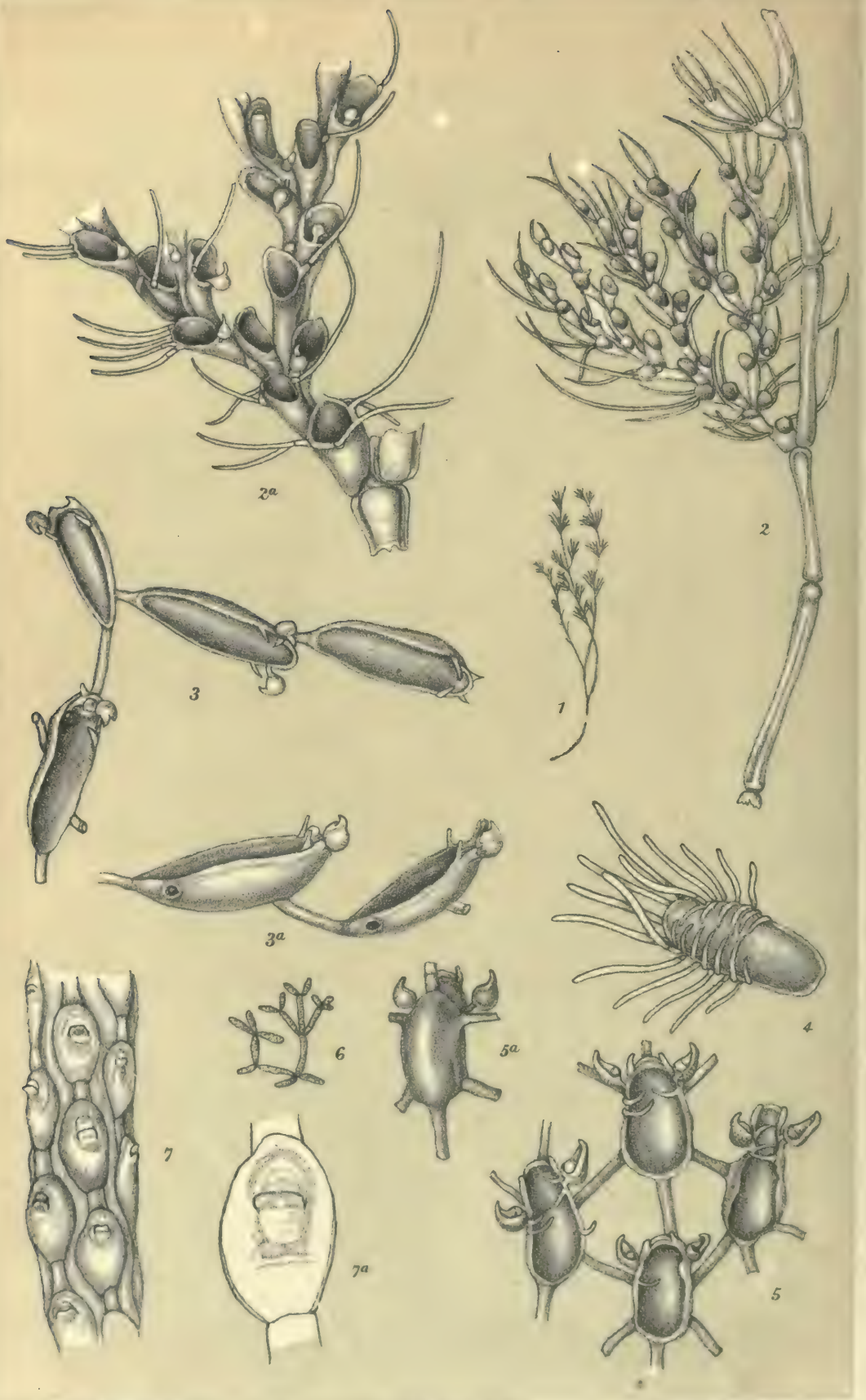

P. H. Macgillivray, del.
J. Ripper, lith.

Prof. McCoy direx.t

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PLATE 195, FIGS. 1 AND 2.

STIRPARIA GLABRA (HINCKS).

[Genus STIRPARIA (GOLDSTEIN). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Bicellariidæ.)

Gen. Char.—Zoarium consisting of tufts of celliferous branches attached to annulated or segmented, articulated stems. Zoœcia biserial, turbinate; aperture opening upwards and forwards, and furnished with marginal or sub-marginal spines.]

DESCRIPTION.—Zoarium erect, branched, branches calcareous, divided into usually alternately longer and shorter internodes, distinctly articulated together. Zoœcia in flabellately branched clusters, articulated to one side of the upper extremity of an internode, commencing by a turbinate zoœcium from which two others arise, giving origin to dichotomously dividing branches; zoœcia alternate, in two continuous series, united side to side, narrowed below and expanded above, the outer angle frequently acuminate; aperture occupying rather less than the upper half of the front of the cell, the margin slightly thickened; three or four long, curved, hollow spines articulated below the margin posteriorly, and frequently a single spine anteriorly from the side of the aperture lower down. A minute capitate avicularium on the edge of the aperture below.

REFERENCES.—*Stirparia glabra*, Hincks, Ann. and Mag. Nat. Hist., March, 1883; *Bicellaria glabra*, Busk, Challenger Polyzoa, Part I., p. 35, pl. vi., fig. 1.

Lorne, a single specimen, Mr. Wooster.

Forms tufts, two or three inches high, attached by slender radical fibres. The stem and branches are calcareous, divided into usually alternately longer and shorter portions distinctly articulated together, the internodes enlarged at their rounded extremities, and generally having a furrow caused by a deficiency of calcareous matter on two sides. The clusters of zoœcia originate from the upper ends of the larger internodes. The first cell is turbinate, with about six long spines, and is articulated to a hollow in the internode. Many of the shorter internodes are barren, but have a small opening similar to those to which the zoœcial clusters are articulated.

The figures and description are taken from South Australian specimens; the only Victorian specimen I have seen being a small, imperfect fragment. It occurs also in Western Australia.

EXPLANATION OF FIGURES.

PLATE 195.—Fig. 1, specimen, natural size. Fig 2, portion of another specimen, magnified. Fig. 2*a*, basal part of zoœcial tuft of same, more highly magnified.

PLATE 195, FIG. 3.

BEANIA INTERMEDIA (HINCKS, SP.).

[Genus BEANIA (JOHNSTON). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Bicellariidæ.)

Gen. Char.—Zoarium creeping or loosely adnate. Zoœcia disjunct, connected by (usually) corneous tubes, erect or decumbent, ovate or boat-shaped, entirely open in front and filled in by a thin membrane. Usually a capitate, pedunculate avicularium, perfect, aborted, or altered in form, on one or both sides towards the upper extremity, in some species absent.]

DESCRIPTION.—Zoœcia much elongated, narrow, sub-erect, anterior extremity rounded, posterior narrow, two short spines or denticles above, and one longer on each side; a capitate avicularium on each side above the lower spine. Each zoœcium connected with one in front by a considerable tube arising from the back and with one on each side by a tube near the posterior extremity. Posterior surface smooth.

REFERENCE.—*Diachoris intermedia*, Hincks, Ann. and Mag. Nat. Hist., Aug., 1881.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

The only specimen I have examined is not in very good condition, but there can be no doubt of its identity with Hincks' species. The points of origin of the lateral connecting tubes seem to vary. In my specimen they are mostly near the posterior extremity, while Hincks describes them as being a little above the middle; in one of the figured zoœcia it will be seen that they are not opposite, one being much farther forward than the other.

EXPLANATION OF FIGURES.

PLATE 195.—Fig. 3, anterior view of part of zoarium, magnified. Fig. 3*a*, lateral view of two zoœcia.

PLATE 195, FIG. 4.

BEANIA CONFERTA (McG.).

DESCRIPTION.—Zoœcia large, each connected with six others by very short tubes; six large, articulated spines above, of which two from the summit project nearly directly forward, a similar pair (one on each side) originating a little farther back point in the same direction, and the third pair, arising opposite the lower edge of the mouth, project upwards and forwards and are curved inwards at their bases; on each side of the aperture a double row of long, stout spines, the outer directed forwards

and outwards, and the inner alternating with these, arching closely over the front of the cell and meeting in the mesial line. Dorsal surface smooth, glassy; in many, especially the marginal cells, a round mark on each side towards the base, probably indicating the attachment of a radical fibre. No avicularia.

Portland, Mr. Maplestone; Port Phillip Heads, Mr. J. Bracebridge Wilson.

This species is readily distinguished from the other Australian forms by the closeness of the cells, the six large spines at the anterior extremity, and the absence of avicularia. The peculiar arrangement of the marginal spines, directed alternately outwards and inwards, is not constant, but when present is very striking. It is closely allied to the form described, from Algiers, by Mr. Hincks (Ann. and Mag. Nat. Hist., Aug., 1881) as *Diachoris hirtissima*, var. *robusta*, from which it differs in having two instead of three superior spines and in the total absence of avicularia.

EXPLANATION OF FIGURE.

PLATE 195.—Fig. 4, single zoœcium, magnified.

PLATE 195, FIG. 5.

BEANIA WILSONI (McG.).

DESCRIPTION.—Zoœcia connected with six others by long corneous tubes, suberect; two or three short, straight, slender spines, and one or two sharp, incurved spines on the margin on each side. Posterior surface smooth. A large capitate avicularium articulated at the upper part of the zoœcium on each side.

REFERENCE.—P. H. MacGillivray, Tran. Roy. Soc. Vict., Nov., 1884.

Port Phillip Heads, Mr. J. Bracebridge Wilson.

Evidently closely allied to the South African *Diachoris distans* of Hincks, from which it differs in having avicularia on both sides, and in the absence of the round marks of the radical tubes posteriorly.

EXPLANATION OF FIGURES.

PLATE 195.—Fig. 5, group of zoœcia, anterior view, magnified. Fig. 5*a*, posterior view of single zoœcium.

PLATE 195, FIGS. 6 AND 7.

VERRUCULARIA DICHOTOMA (BUSK, SP.).

[Genus VERRUCULARIA (VON SUHR). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Farciminariidæ.)

Gen. Char.—Zoœcia elliptical or rounded, convex, bordered by a narrow chitinous line, alternate in longitudinal series, separated laterally by an intercellular substance. Mouth a little below the summit. No avicularia.]

DESCRIPTION.—Zoarium membranous, consisting of bi- or trichotomously divided branches. Zoœcia arranged around an imaginary axis, alternate in longitudinal series separated by a smooth intercellular space, elliptical or ovate, separated from those of the same series by a narrow quadrate space; each zoœcium surrounded by a narrow chitinous rim, a similar line also on each side of the spaces joining those of a series; mouth above the middle of the zoœcium, rounded, the lower lip forming a projecting membranous valve.

REFERENCES.—*Farciminaria dichotoma*, Busk. Quart. Journ. Mic. Sc., New Ser. i. 155. *Flustrella dichotoma*, Hincks, Ann. and Mag. Nat. Hist., May, 1884.

Port Phillip Heads.

This species has a close affinity in its structure to *Flustrella*, but I cannot agree with Hincks in referring it to that ctenostomatous genus. It, however, undoubtedly forms a close connecting link between the two sub-orders. It seems to me that, notwithstanding the absence of avicularia and oœcia and the structure of the mouth, it ought more properly to be referred, as has been done by Busk, to a family of Cheilostomata along with Farciminaria.

It occurs in tufts, one or two inches high, consisting of numerous di- or trichotomously divided cylindrical branches. The zoœcia are arranged in usually six longitudinal series, separated from each other by a continuous intercellular substance; each zoœcium is surrounded by a narrow chitinous line, a similar line also bounding the space by which the cells of a series are separated from each other. They are convex; the mouth projects, the lower lip forming a nearly quadrate flap with a narrow thickened chitinous rim.

Von Suhr, in founding the genus, placed it among the algæ, but the erroneous interpretation of its structure is no reason, as already stated by Busk, for not adopting his name.

EXPLANATION OF FIGURES.

PLATE 195.—Fig. 6, specimen, natural size. Fig. 7, portion of branch of another specimen, magnified. Fig. 7*a*, single zoœcium of same, more highly magnified.

The specimens and descriptions of the Polyzoa illustrated by this plate are from Mr. MacGillivray.

FREDERICK MCCOY.

ZOOLOGY OF VICTORIA
(Polyzoa)

P.H.Mac.gillivray del.
J.Ripper lith.

Prof.McCoy direxit

Steam Litho Govt Printing Office

PLATE 196, FIG. 1.

THAIROPORA ARMATA (McG.).

[Genus THAIROPORA (McG.). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Microporidæ.)

Gen. Char.—Zoœcia calcareous, traversed by bands or transverse fissures and covered with a continuous epitheca; mouth arched, higher than broad, lower margin of operculum hollowed; a stout, unarticulated, mamillate or bullate process in a separate tract on each side of the mouth. Avicularia at the base of or replacing zoœcia, mandible strengthened by a stirrup-shaped thickened chitinous band.]

DESCRIPTION.—Zoœcia quadrate, alternate, of a whitish colour, calcareous layer granular or perforate, with few indistinct lines; epitheca rather thin. Oral processes large, of equal size. Avicularian mandibles broadly lanceolate, directed upwards, strengthening band produced upwards from the junction of the lateral branches and with a broad membranous band on either side.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., Dec., 1881.

Queenscliff.

EXPLANATION OF FIGURE.

PLATE 196.—Fig. 1, group of zoœcia magnified, showing two avicularia.

PLATE 196, FIG. 2.

THAIROPORA MAMILLARIS (LAMX. SP.).

DESCRIPTION.—Zoœcia quadrate, alternate; calcareous lamina very thin, with few lines; epitheca thick, brown or purple. Mouth with the oral processes of moderate size, equal or occasionally one larger. Avicularian mandibles elongated, branches of strengthening band meeting at an acute angle and produced into a vertical process, without membranous margins.

REFERENCE.—Prod. Zool. Vict., pl. 25, fig. 4.

This species has already been described as *Membranipora mamillaris* and figured on plate 25, but a fresh figure is now given to better show the differences between it and *T. armata*, from which it is readily distinguished by its purplish or dark brown colour, the thicker epitheca, and especially by the different form of the stirrup-shaped support of the avicularian mandible which has no membranous margin.

EXPLANATION OF FIGURE.

PLATE 196.—Fig. 2, Two zoœcia and avicularium.

PLATE 196, FIG. 3.

THAIROPORA JERVOISII (HINCKS SP.).

DESCRIPTION.—Zoœcia large, alternate; calcareous lamina thick, finely granular or punctate, usually traversed by two prominent raised lines crossing the zoœcia and connected in the centre by a similar vertical line, or by two from one side meeting about the centre and continued as a single line across the remainder of the zoœcium. Mouth large, lofty, oral processes large mamilliform. Avicularian mandible broadly triangular, the lateral branches not produced and with a very narrow membranous fringe.

REFERENCE.—*Steganoporella Jervoisii*, Hincks, Ann. and Mag. Nat. Hist., 1880; *Thairopora Jervoisii*, MacGillivray, Tr. Roy. Soc. Vict., July, 1886.

Sorrento, Rev. Dr. Porter.

Of this species I have only a single Victorian specimen, but I have received several from South Australia. It differs from *T. armata* and *mamillaris* in the greater size of the zoœcia, the strong band on the calcareous lamina, and the different structure of the avicularian mandible. The avicularia seem to be very rare and are present on only one of my specimens which I unfortunately did not receive until after the plate was lithographed. As far as I can make out from an examination *in situ* there is an extremely narrow scarcely perceptible fringe. Almost all the specimens are destitute of the epitheca, but in one it appears in parts as a thin silvery layer. None of my specimens have the lateral foramina described and figured by Mr. Hincks, in consequence of which he referred it to the genus *Steganoporella*, although he subsequently (Ann. and Mag., 1887) mentions it as a *Micropora*.

The genus *Thairopora* as first proposed by me was differentiated from *Membranipora* by the presence of a complete articulated operculum. Subsequent examination has shown, however, that the front wall is not membranous, but consists of a calcareous layer covered by a chitinous epitheca. The calcareous lamina is very thin in *T. mamillaris*, but of considerable thickness in the others. In *T. mamillaris*, *armata*, and *Jervoisii*

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE XX.

BY

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M DCCC XC.

PREFACE.

THIS Twentieth Decade completes the Second Volume of the Prodromus of the Zoology of Victoria.

A systematic index is given of the contents of the first twenty Decades, comprising plates 1 to 200, combining the contents of the first and second volumes, according to which the plates with their corresponding letterpress may be bound in zoological order, all the illustrations of each class being put together by those who desire it. Those who prefer to bind the plates and corresponding letterpress in the order of their original appearance, and as the plates are consecutively numbered, can do so, bringing the prefaces together at the front. An alphabetical index is also given of the contents; the generic, specific, and popular names being included, as well as the synonyms, which latter are in italics.

I am greatly indebted to Mr. Simons for the high intelligence and painstaking accuracy with which he did me the favour to prepare these Indices—a task so onerous that I feel very grateful for his friendly help in relieving me of it—and with such care that they materially increase the value of these volumes.

The first plate in this Twentieth Decade represents two of the commonest of the beautiful small lizards constituting the genus *Hinulia*, with magnified details.

The second plate gives for the first time the colours of life of a lovely species of Dragonet, as similar fishes are called in England, not uncommon in Hobson's Bay, the *Callionymus calauropomus* (Rich.).

The third plate figures for the first time a beautiful kind of Red Gurnet-Perch, the *Neosebastes Scorpænoides* of Guichenot, not uncommon in the fish shops all the year round.

The fourth plate shows the details of a new little Fish, the *Trachinops caudimaculatus* (McCoy), sent to me by the Commissioner of Customs to determine whether it were, as the local fishermen assured him, the young of the Californian Salmon introduced by Sir Samuel Wilson!—So little are the native Fishes known for want of figures for reference.

The two following plates continue the illustrations of the valuable specimens and descriptions of the Polyzoa of our coast, given by Mr. MacGillivray.

The seventh plate shows the two sexes of one of the largest and most elegantly coloured of Victorian Moths, with its larva, pupa and cocoon to illustrate its metamorphoses.

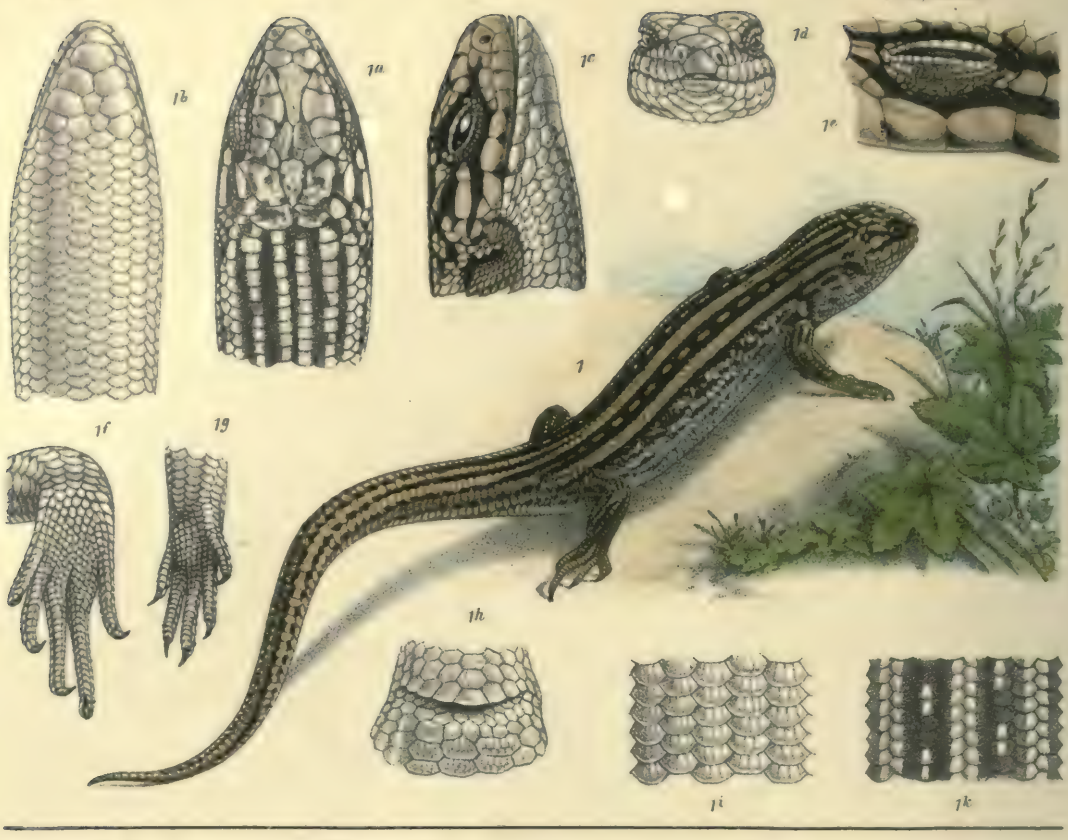
The eighth plate shows both sexes of the imago, with their larvæ and pupæ, of two species of butterfly of the genus *Pyrameis*, which have caused great alarm by appearing, for the two or three weeks of the end of September and beginning of October this year, in countless myriads over a great extent of country, forming heaps on the seashore for miles where drowned and washed in by the tide. (They were accompanied by such clouds of a Moth, *Agrotis spina*, that the houses were filled and the lights put out by their numbers, and walking was unpleasant from their multitudes in the air; and the ships for some miles out at sea were blackened with them.) One of these butterflies, the *Pyrameis Kershawi* (McCoy), has not been figured before, having been previously confounded with what was supposed to be the cosmopolitan *P. cardui*, or so-called Painted-lady Butterfly, quoted in most books of Physical Geography and Distribution of Animals as extending from England to Australia, but which it replaces here.

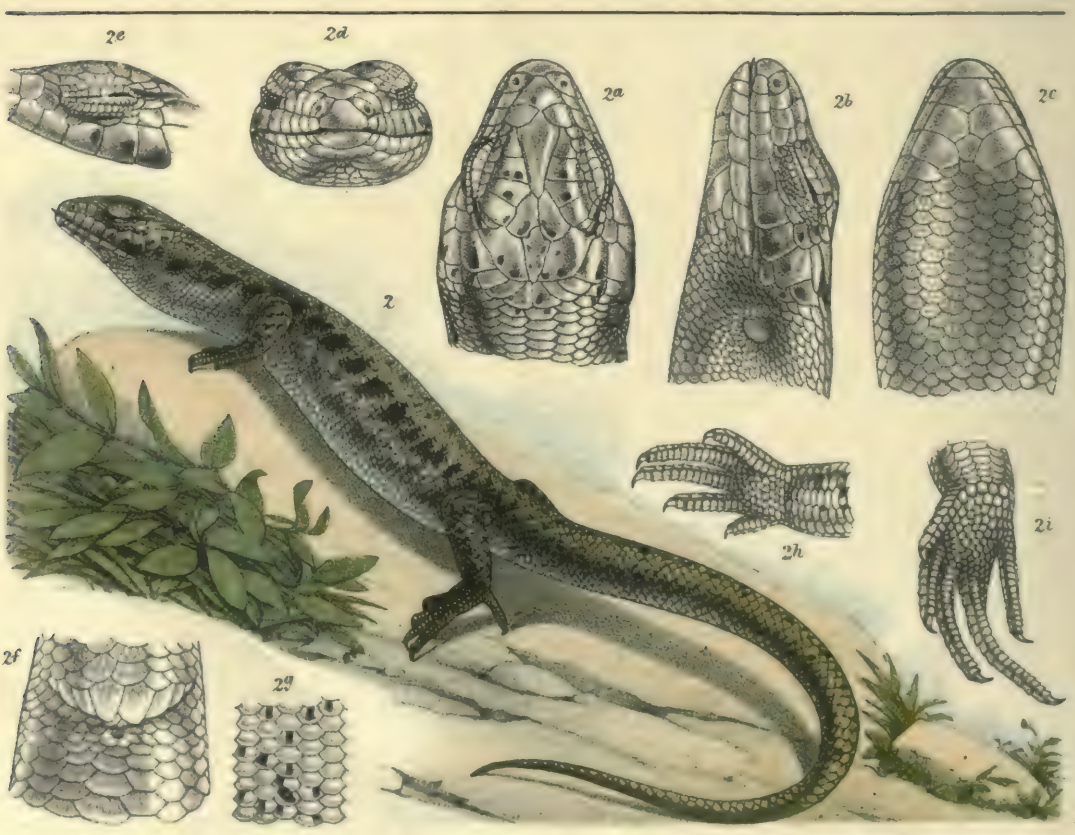
The ninth plate shows that curious Crab, the *Ibacus Peronii*.

And the tenth plate is in illustration of three species of our most abundant Starfishes, not figured of the colours of life before.

FREDERICK McCOY.

20th October, 1889.





Dr Wild del. & lith

Prof McCoy direxit

Steam Litho Government Printing Office

it is also traversed by various thickened lines or bands, much less prominent in the first. In *T. Woodsii* and *dispar* it is crossed, a little below the mouth, by a transverse or oblique fissure, the edges of which are finely denticulated. The true *Microporæ*, to which the genus is most nearly allied, agree in having a calcareous anterior wall covered by a thick epitheca, with the lower margin of the oral aperture thickened and the lip formed by a complete articulated flap. The form of the mouth, however, is quite different; in *Thairopora* it is very much loftier and narrower and always has a thick, calcareous, sessile, mamilliform or bullate process in a separate space on each side, frequently differing in size; while in *Micropora* the mouth is wider than high, and there are either no oral processes or they are slender articulated spines.

The peculiar dividing lines or fissures on the calcareous front walls are quite different from anything seen in *Micropora*. I am not sure that it would not be advisable to separate the species with the transverse fissures as a distinct genus. A similar division exists also in *Diploporella cincta*, which also agrees in the form of the mouth and operculum and the presence of the thick sessile oral processes. The structure of the zoœcium, however, is otherwise so distinct as to leave no doubt of the propriety of referring it to a distinct genus.

PLATE 196, FIGS. 4, 5, AND 6.

MICROPORA CORIACEA (ESPER. SP.).

[Genus MICROPORA (HINCKS). Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Microporidæ.)

Gen. Char.—Zoœcia with the front wall calcareous, covered with a thick epitheca; no transverse bands or fissures, but frequently several large perforations. Mouth with lower lip straight and thickened, wider than high; lower edge of operculum straight; oral spines either wanting or slender and articulated. Oœcia external. Avicularia at the base of zoœcia.]

DESCRIPTION.—Zoœcia ovate or quadrate; separating margins thick and prominent, frequently raised into a clavate process on each side of the mouth; surface smooth, granular or punctate, frequently with a distinct round foramen on each side. Mouth arched above, lower lip thickened and usually finely crenulated. Oœcia large, convex, prominent or subimmersed, smooth, or tubercular, or umbonate, or slightly carinate. Avicularia small, with triangular mandibles, situated on separate tracts at the bases of zoœcia.

REFERENCES.—*Membranipora coriacea*, Busk., Brit. Mus. Cat. Mar. Pol., ii., 57, pl. lxxiii., figs. 4–5; *Micropora coriacea*, Hincks, Brit. Mar. Pol., p. 174, pl. xxiii, figs. 5–7.

Common on shells and stones.

This species varies a good deal. The anterior surface is smooth or granular and frequently has a large round pore on each side, generally towards the mouth. The separating margins are occasionally (in European specimens usually) raised into a small clavate boss on each side of the mouth. The oœcia are mostly subimmersed, but are sometimes quite prominent.

A very marked variety which I have described (Trans. Roy. Soc. Vict., 1886) as *angusta* is not uncommon. The zoœcia are very long and narrow, quadrate; the margins very prominent and crenulated; the surface granular. There are no distinct foramina, but a depression in some cases gives an obscure appearance of such. The lower lip is thick and pouting. The oœcia are sub-immersed, usually without any elevation but occasionally with a slight knob or ridge. The whole zoarium is silvery and frequently only loosely adnate. *Steganoporella elongata* (Hincks, Ann. and Mag. Nat. Hist., Nov., 1880) from Africa very much resembles this form. Mr. Waters also (Ann. and Mag. Nat. Hist., July, 1889) refers some specimens from Port Jackson to the same species as *Micropora elongata*, stating that in examining a series there is little difference between it and *M. coriacea*. He also mentions that in some of the zoœcia the marginal openings (opesiules of Jullien) are not to be seen while in others there are more than one on each side.

EXPLANATION OF FIGURES.

PLATE 196.—Fig. 4, group of zoœcia from a colony with the anterior surface nearly smooth, the lateral pores large, the margins not raised at the oral apertures and the oœcia prominent. Fig. 5, part of another colony, having the surface granular and punctate, the margins forming clavate knobs and the oœcia umbonate. Fig. 6, var. *angusta*, showing the elongated quadrate zoœcia, the thick crenulated margins, the pouting mouth, and subimmersed oœcia.

PLATE 196, FIGS. 7–10.

RHYNCHOPORA BISPINOSA (JOHNSTON SP.).

[Genus RHYNCHOPORA (HINCKS). (Sub-kingdom Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Family Escharidæ.)

Gen. Char.—Zoarium encrusting. Zoœcia closely adherent to each other. Primary mouth transversely elongated, straight, or with a slight sinus in the lower lip; secondary mouth with a prominent mucro on the lower margin, and an uncinate process immediately above it within the mouth.]

DESCRIPTION.—Zoarium encrusting. Zoœcia when young ovate or pyriform, distinct, and horizontal; when older becoming small, confused and indistinct; sometimes perforated at the margins; surface usually smooth but occasionally rough or tubercular. Primary mouth transversely elliptical, with a very slight sinus in the lower lip and two straight, articulated spines (mostly absent) above. Secondary mouth rounded, with an uncinate process within towards one side; a transverse suboral avicularium, with pointed mandible on the anterior part of a mound-like elevation, or a prominent mucro. Other smaller avicularia on elevations on the front of the zoœcia. Oœcia prominent in the younger parts, but becoming subimmersed or immersed in the older, with the orifice closed by a calcareous operculum.

REFERENCE.—*Rhynchopora bispinosa*, Hincks, Brit. Marine Polyzoa, p. 385; pl. xl., figs. 1–5.

Port Phillip Heads.

This peculiar species is exceedingly variable. The oral spines are very rarely present. As growth proceeds in the young cells an uncinate or anvil-shaped process is developed towards one side of the mouth and usually a smaller more erect process from the other, the two frequently forming a complete or nearly closed round opening. Below or on the front of the uncinate process a large transverse avicularium is formed on a mound-like elevation, or in its place a prominent rostrum, or very rarely both. In many specimens no avicularia are found. In the usual condition of the older parts, the zoœcia are smaller, indistinct, with the mouth large, roundish, and the lower edge with a large transverse avicularium obscuring the parts within. In many zoœcia, especially the older, there are one or more smaller horizontal avicularia on large elevations. These, however, as well as the oral are not infrequently altogether absent. The peristome may be produced into one or more processes on either side. The suboral rostrum

also varies very much, being of moderate size and smooth, or large and granular or tubercular. The zoœcia are usually smooth, but may be covered with large granulations, and the margin has frequently a row of perforations. The oœcia are at first prominent, but become immersed with age. In the older ones the opening is closed by a thick operculum, which may be smooth or faintly granular or lined. When deeply immersed the operculum is nearly vertical.

I have several specimens on shell from shallow water which I was at one time inclined to consider as a distinct species. It may be called var. *delicatula*. All the zoœcia are horizontal. The uncinate and opposite oral processes unite or nearly so, and a round elevation is formed on the base of the former. Two glassy elevations first appear below the mouth followed by others over the surface of the older zoœcia. There are few or no avicularia. The oœcia are prominent, smooth, or with a slight umbo, and the opening is small and has no apparent operculum.

EXPLANATION OF FIGURES.

PLATE 196.—Fig. 7, usual appearance of older colonies, showing confusion of cells and oral and zoœcial avicularia. Fig. 8, group of young cells from growing edge of another colony. Fig. 9, marginal zoœcia from edge of specimen of var. *delicatula*, showing primary mouth, uncinate and oral processes, uncinate process with rostral elevation, and two elevations on front of zoœcia. Fig. 10, single oral opening from another specimen.

PLATE 196, FIGS. 11–14.

RHYNCHOPORA LONGIROSTRIS (HINCKS).

DESCRIPTION.—Zoarium adherent. Zoœcia when young, large, ovate or pyriform, distinct, frequently separated by rows of pores, smooth at the extreme edges of the colony but becoming slightly granular farther back; primary mouth transversely elliptical, without sinus; when old indistinct, granular, mouth quadrate, an uncinate process to one side of the lower lip with the sharp point directed nearly across to the other side; below the uncinate process is a small avicularium with broadly triangular mandible on an elevation, which also is frequently developed into a mucro. Numerous large avicularia on the front of the zoœcia with long, ligulate mandibles pointing downwards. Oœcia immersed, smooth or slightly granular, with a calcareous operculum.

REFERENCES.—Hincks, Ann. and Mag. Nat. Hist., Aug., 1881; *R. profunda*, MacGillivray, Tr. Roy. Soc. Vict., Oct., 1881.

Port Phillip Heads ; Portland, Mr. Maplestone ; Warrnambool, Mr. Watts.

In many of the younger zoœcia the oral avicularia are not developed. The extreme marginal zoœcia, before the formation of the uncinate processes, are smooth, those behind are granular. In the fully formed zoœcia the surface is glistening and granular. The mouth is irregularly quadrate, the elevation on the upper side of which the avicularium is situated is sometimes scarcely apparent, at other times, as in the figure, it is of considerable size. It may rise into a mucro, in some specimens becoming developed to such an extent as to obscure every other part. The peristome may have one or more small pointed processes. The zoœcial avicularia are usually as figured, but occasionally they are extremely narrow, or may be as small as in *R. bispinosa*.

The form which I described as *R. profunda*, I now believe to be a mere variety of the present, in which the calcareous matter is so much developed that the mouth, with the large uncinate process, lies very deep, and the surface is very roughly granular or nodular.

EXPLANATION OF FIGURES.

PLATE 196.—Fig. 11, portion of a fully developed specimen. Fig. 12, two marginal zoœcia from another specimen. Fig. 13, young zoœcia from var. *profunda*. Fig. 13*a* and 13*b*, portion of same specimen, showing fully formed zoœcia. Fig. 14, portion of specimen with excessive growth of mucros.

Mr. MacGillivray has furnished the specimens and descriptions for this plate.

FREDERICK McCOY.

A. Bartholomew del.
Dr. Wild lith

Prof. Coy sculpt.

Stewart Litho. Govt. Printing Office

PLATE 197.

CHELEPTERYX COLLESI (GRAY).

[Genus CHELEPTERYX (GRAY) = MEGETHNA (WALK.). (Sub-kingdom Articulata. Class Insecta. Order Lepidoptera. Section Heterocera. Tribe Bombyces. Family Liparidæ.)

Gen. Char.—Male: Body very thick. Antennæ much longer than thorax, slender; bipectinate in both sexes; the incurved pectens deflexed, of the male long, of the female much shorter. Proboscis or maxillæ obsolete. Palpi stout, short, porrect, hairy, and obtuse; first joint very short, third joint minute, conical. Head, thorax, and abdomen and base of wings pilose, thickly clothed with long fine hairs, longest at tip of abdomen. Abdomen as long as hind wings, Wings long, broad, entire; anterior ones subtriangular; anterior margin much longer than the others, straight near base, gently convex on distal half; outer margin oblique in males, concave in the middle; in females nearly straight, inner angle much rounded, tips nearly rectangular, rounded; posterior wings with anterior margin reaching considerably beyond the posterior portion of anterior wings, posterior edge rounded, but concave near falcate apex; surface of wings covered with hairy scales, slightly diaphanous and with two clear spots near apex of anterior pair; discoidal cell of posterior wings closed. Legs stout, femora densely furred, anterior tibiæ tufted below; long slender spines at apex of four posterior tibiæ, two on second pair, four on hind pair. *Female:* Size much larger than male. Palpi more slender than in male, third joint elongate, about half the length of second. Antennæ bipectinate, but pectens much shorter than in male; Larvæ with sixteen legs, and rows of tubercles set with long stinging hairs. Pupæ in cocoon. Australia.]

DESCRIPTION.—*Male:* Usual width of Victorian specimen from tip to tip of expanded wings, 5 inches 3 lines. Base, anterior margin, and posterior angle greyish brown, upper portion of outer margin dark brown, middle portion of wing reddish chesnut brown; a branched pair of narrow, undulating, blackish-brown streaks uniting before reaching inner edge on basal third of wing, a broader less definite one crosses middle of reddish third, and a third narrower one scalloped between the veins forms outer boundary of reddish portion; beyond which is an irregular, broad, greyish, scalloped band; two oval, talc-like, white, translucent spots near apex in dark-brown outer border between the second, third, and fourth nerves; a small, light, roundish spot about middle of length and one-fourth of width from anterior edge; posterior wings very dark rich chocolate brown, with a broad, indefinite, lighter band beyond the middle, and an indistinct row of yellowish spots on the veins; the dark colour scalloped between the veins and bordered by a rich brownish yellow, narrow line, beyond which a broad band of rich greyish brown forms the posterior margin. Body brown, darkest on front of thorax, lightest towards tip of abdomen. Underside of both wings rich, minutely speckled, brownish grey with two undulated, narrow, dark streaks crossing them a little outside the middle, within which is a large, rich blackish brown, triangular space within a light grey anterior margin, and containing a light angular spot near outer edge, and the median spot, which is more conspicuous than on upper side; head, antennæ and legs dark brown, tuft under anterior tibiæ bright glossy brownish yellow; under side of thorax and abdomen pale yellowish buff or fawn colour. *Female:* About 6 inches from tip to tip. Much duller and lighter than the male, with nearly similar markings of pale cold sepia brown and minutely speckled brownish ashy grey; the veins on posterior wings ochraceous near outer margin; median spot and two translucent talc spots near tips more conspicuous than in male; under side marked like male but paler, and with the central and angular light spots near outer edge of dark triangular basal half more conspicuous. *Larvæ:* about 4 to 5 inches long, covered with close set, glossy coating of fine depressed hair of a black colour, with narrow, transverse, whitish bands, and eight longitudinal rows of large yellow tubercles (the second and third segments having an additional pair in front of the

others), and the first segment having a raised yellow band across the back with a tubercle at each end, all set with very long stiff, rough, stinging bristles, the anterior and posterior ends have most of the black stinging bristles, and they are mixed with long white hairs there and over the legs; legs, head, and last segment and two raised bands between the legs, yellow. Pupa rich reddish chocolate brown; about 2 inches long and 8 lines wide, terminated with a bunch of short bristles at posterior end. Cocoon about 4 inches long, and 1 inch wide, fusiform, longitudinally furrowed, of dull brownish-white tough silk, set with the stinging hairs of the larva.

REFERENCES.—Trans. Ent. Soc. Lond., v. 1, p. 122; = *Saturnia Laplacei*, Feisthamel Voy. de la Favorite, t. 8, 9; = *Festra affabricata*,' Wallengren Eugenies Resa Omkring Jorden.

Of all the *Bombyces*, or full-bodied Moths, this is the most striking from its great size and brilliant colouring. The Victorian specimens are a little smaller and duller than those of New South Wales, where it is even more abundant than with us.

The larvæ feed on the leaves of different so-called Gum-trees, or species of Eucalyptus, particularly young ones of 10 to 15 feet high, and not on the very large ones as a rule. They are common from October to the end of the year, reaching their adult length and assuming the pupa state towards the end of December, weaving the large, tough, silk cocoon in crevices of the bark or under the loose bark of Gum-trees. The stinging spines or bristles with which the larva is covered pierce the skin of the hands very readily, producing a very unpleasant irritation, and it weaves them into the outer surface of the cocoon at the end of its larval life, continuing this offensive and defensive provision to the cocoon for the pupa stage.

The perfect insect or imago comes out in March and April.

In Victoria this fine insect is chiefly found in Gippsland, where so many other New South Wales animals seem to extend south along the ranges; it is common at Mordialloc and Brighton, near Melbourne, but Mr. Kershaw informs me that it has not occurred to him when collecting in any of the northern and western parts of the colony.

EXPLANATION OF FIGURES.

PLATE 197.—Fig. 1, male, natural size. Fig. 1*a*, bipectinate antennæ, magnified. Fig. 2, female, natural size. Fig. 2*a*, bipectinate antennæ, magnified. Fig. 3, larvæ, natural size, side view. Fig. 3*a*, hind segments of larvæ, viewed from above. Fig. 3*b*, head and anterior segments, viewed from above. Fig. 4, pupa, natural size. Fig. 5, cocoon, natural size.

FREDERICK MCCOY.

A Bartholomew del
D^r Wild lith

Prof^r M^cCoy del on wood

Steam Lithic Gov^t Printing Office

PLATE 198, FIGS. 1–4.

PYRAMEIS ITEA (FABR.).

AUSTRALIAN ADMIRAL BUTTERFLY.

[Genus PYRAMEIS (HÜBN.):<CYNTHIA (FABR.). (Sub-kingdom Articulata. Class Insecta. Order Lepidoptera. Section Rhopalocera. Family Nymphalidæ. Sub-family Nymphalinæ.)

Gen. Char.—Head moderately broad, densely hairy; eyes closely covered with fine short hairs; palpi long, converging at tips; second joint elongate, thickened beyond middle, with long hairs on upper and outer sides, scaly and with fine down below; terminal joint large, compressed, acuminate, and slightly downy. Antennæ rather long, club abrupt, flattened, elongate ovate, terminal joint minute, pointed. Thorax large, densely hairy, especially on breast and back of metathorax. *Fore wings* a little narrowed and produced at upper outer angle; costa only slightly arched; outer margin sinuate, concave about middle; inner margin nearly straight; costal nervure ending about middle of costa; first and second sub-costals rising close together, a little before end of discoidal cell; third sub-costal arises about one-third from cell to apex, and ends at apex; upper disco-cellular nervure obsolete, middle one very short, and third or lower disco-cellular nervule very long, nearly obsolete (replaced by a sulcus in the wing, indicated by dotted line in our plate), ending on third median nervule near its origin, so that discoid cell seems open or nearly so. *Hind wings* broad; costal nervure slightly arched, prominent at base; hind margin dentate-sinuate, lobes on first and third median nervules larger than the rest; anal angle well marked; inner margins meeting to form a deep groove to a little beyond end of abdomen, beyond which they are notched and divergent; costal nervure extending to apex; discoidal cell very short, closing lower disco-cellular nervule, long, oblique (dotted in our plate), joining median nervure at origin of its second nervule; internal nervure reaching end of inner marginal groove. *Fore legs* of male very densely covered and fringed with hair, especially on tibia and tarsus; of female similar, but with five indistinct articulations, spinous beneath, and hairy, chiefly on basal portion. *Middle and hind legs* long, stout, scaly; tibiæ with two inner and one outer row of spines, terminal spurs long; tarsi very spinose at sides and below; terminal claws stout, curved. *Abdomen* short, thick. *Larva* elongate, with rows of rigid spines set with bristles; head and next segment without spines. *Pupa* stout, angulated, tuberculated on back of abdomen; head bluntly bifid; surface gilt in spots and patches. Cosmopolitan.]

DESCRIPTION.—*UPPER SURFACE.*—Head, palpi, thorax, and abdomen blackish, covered with dense, dark, rich brown hairs. Antennæ blackish-brown, tipped with tawny. *Anterior wing:* Basal portion of a rich, light, rusty yellowish-brown, bounded about midde of discoidal cell by a narrow black band concave outwardly, arching from costa to origin of first or lower median nervule; beyond this the wing, obliquely crossed by a large oval spot of a rich cream colour, extending from costa to sub-median nervure, and from origin of first median nervule to origin of second median nervule; beyond this to apex and inner margin black, with three white spots, the inner one largest, tinged with cream colour, divided by two nervules a little nearer large cream spot than tip of wing, and extending from costa to second or lower discoidal nervule; second smallest, narrow, arched, nearer to tip than to first spot, traversed by one nervule; third spot oblong, in space between third or upper median nervule and second or lower discoidal nervule, and half-way between first spot and margin; fringe with small white lunules between nervules. *Posterior wing:* Basal portion, as in anterior wing, rusty yellowish-brown, dense scales and long hairs, the hairs on channel of deflected inner edge very long and of a lighter mouse-colour brown; beyond this the disc, bright rusty chestnut, a broad anterior and narrower outer marginal space brownish-black, with a row of narrow white lunules in the fringe at edge between the nervules; a curved row of four round black spots, with small blue centres within the black margin on the disc, and a narrow light lunate

mark on edge of black margin at anal angle, narrowly edged above with blue. *UNDER SURFACE.—Anterior wing:* Base bright chestnut, with black mark and cream median spot, as on upper surface; costal area, as far as large central cream-colour patch, black, with many transverse white lines; black apical portion as in upper surface, but brownish near tip; first arched cream-colour spot larger than on upper sides, and with a large blue circle with black centre, on black between it and median cream patch; second and third spots as on upper surface, but with two ocellated spots of black outlines and black dot in centre between them on brownish apical area; two faint purplish-grey lines parallel to margin near edge. *Posterior wing:* Mottled with three shades of dark walnut-wood brown and dull purplish-grey lines; five irregularly unequal circular ocellated spots under those of upper surface, but much larger, a dark outline and small central dark dot to each on brown ground; beyond this a broad greyish margin to edges, including a dark narrow continuous undulating line in middle, parallel to edges; near end of internal nervure; between it and hind edge, is a light-grey triangular patch with a conspicuous black round spot in its middle; two or three transverse oblong dark-brown patches on the discoidal cell, and three or four angular ones on the spaces above and below the basal half of the costal nervure, and first and second sub-costal nervules are narrowly edged with white. *Measurements:* Expanse of male from tip to tip, 2 inches; of female, 2 inches 4 lines. *Larva:* Varying in colour, some black, with numerous transverse rows of minute white dots, greyish below, feet and spines blackish, with a conspicuous broad light-colour band on each side over the feet, and a more slender one over it on each side. Others pale-brownish on back, flesh colour on sides and below, and with yellowish spines and feet. Length a little over 1 inch. Feeds on nettles. *Pupa:* Richly gilt, head bifid, with two acute conical lateral angles; two rows of large conical spines along abdomen. Length 11 lines.

REFERENCE.—Fabr. Syst. Ent., p. 498; Sp. Ins., p. 82; Don. Ins. N. H., t. 26, f. 1.

All the Butterflies of the family *Nymphalidæ* (comprising over four thousand distinct species, or about four times as many as any other family of diurnal *Lepidoptera*) agree in the peculiarity of having the anterior pair of legs too small to be used for walking or clinging in both sexes, but most defective in the males, without joints to the tarsus or claws, the female having the tarsus indistinctly 5-jointed, but without claws; while the genera like *Pyrameis* of the sub-family *Nymphalinæ* have the discoidal cell in the hind wings open (that is, not closed by the lowest disco-cellular nervule, which is absent). In the two species on our Plate 198 there is in its place a slight narrow groove or inflection of the surface in the position usually held by the lower disco-cellular nervule, which casts a shadow, making it look like a nervule and possibly leading to mistakes if the character be carelessly observed; I have represented it with dotted lines on the outline plan of the nerves of the wings, Fig. 1*b*.

In the two species of *Pyrameis* on our plate the pupa is suspended head downwards by the tip of the tail only, as in others of the family *Nymphalidæ* (hence sometimes called *suspensi*) and generally in those groups having the front pairs of legs aborted.

Like all of the sub-family *Nymphalinæ*, the species of *Pyrameis* are remarkably robust and vigorous in habit, and have conspicuously prominent scaly palpi projecting in front of the head; long stout antennæ; stout spiny middle and hind legs; and the unusually deep groove for the reception of the body formed by the inflection of the dilated inner margin of the hind wings. The males, as usual in Butterflies, are smaller than the females, with more slender, compressed abdomen and larger thorax.

The *Pyrameis Itea* has received the popular name of Australian Admiral from English collectors in Australia, who recognise some relationship to the European species of the same genus, known as the "Red Admiral Butterfly," to which it has, however, only a generic affinity, the specific characters being totally unlike. The habits are like all of the genus, flying vigorously near the ground and to seven or eight feet high, frequenting gardens and resting on flowers, particularly *Lantana*. It is found nearly all the year round and has several broods in the year.

EXPLANATION OF FIGURES.

PLATE 198.—Fig. 1, female, upper side, natural size. Fig. 1*a*, ditto, under side. Fig. 1*b*, diagram of nervures and nervules of both wings (the groove or false disco-cellular nervules dotted). Fig. 1*f*, first leg with hairs scraped off, to show anchyloses of tarsal joints (the two points at end are not claws but coarse hairs), magnified three diameters. Fig. 1*g*, ditto, with its hairs seen in profile, magnified two diameters. Fig. 1*h*, ditto, seen in front, magnified two diameters. Fig. 1*d*, second pair of legs, magnified two diameters. Fig. 1*e*, third leg, magnified two diameters. Fig. 1*c*, tarsus and claws of third leg, magnified fifteen diameters. Fig. 2, larva of black variety, natural size. Fig. 3, larva of light-colour variety, natural size. Fig 3*a*, anterior portion of ditto, magnified three diameters, showing compound spines (absent from head and first following segment). Fig. 4, pupa, natural size.

PLATE 198, FIGS. 5–8.

PYRAMEIS KERSHAWI (McCOY).

THE BLUE-SPOTTED PAINTED-LADY BUTTERFLY.

DESCRIPTION.—*UPPER SURFACE.*—Head, thorax, and abdomen covered with dense golden-brown hairs; antennæ blackish-brown tipped with white. *Anterior wing:* Basal portion dusky-black, covered with dense golden-brown scales and hairs; apical portion from apex to beyond middle of costal margin, including end of discoidal cell, black, the inner edge of the black forming two angular projections directed

towards base, the upper one nearly rectangular, the lower one more obtuse and continuous, with a brownish-black outer margin to wing, and containing, nearer to inner edge than to apex, an arched white stripe from costa, divided into three by nervules, truncated below by fifth sub-costal nervure; beyond this a curved row, parallel to outer edge, of four white spots, the upper at costa largest and quadrate, the three lower rounded, upper one smallest, and lower one largest touching discoidal nervule; one row of small lunulate markings parallel to and near hind margin, the upper ones white, two or three lower ones brownish; fringe of edges checkered with white between nervules; median portion of wing pale-reddish tawny, with triangular black spot about middle of discoidal cell, base at upper sub-costal nervure, apex nearly touching inner side of a more acute triangular black mark, the base of which comes from near middle of lower boundary of discoidal cell, continuous below, with irregularly indented arched black mark extending partly along first, second, and third median nervules. *Posterior wing:* Costal and inner portions broadly margined with brownish-black, the latter coated with golden-brown scales and hairs, longest and silky on inflected inner edge; beyond discoidal cell a broad triangular black mark extends from inner dark part, arching towards costal dark margin, but either very thin or more commonly interrupted between upper median nervule and discoidal nervule; beyond this an arched row, parallel to outer edge, of four round spots, the anterior one black, the three posterior bright cobalt-blue, with a narrow black outline; beyond these a row of irregular oval black spots, the two next angle with their outer edges blue, and another row of black rounded or rhombic spots near edge on the nervules, with intermediate white fringe at edge. *UNDER SURFACE.*—Body and legs very pale-brown; palpi greyish-white. *Anterior wing:* Paler, but nearly like upper surface in colour and marking, but usually more distinctly bright pale-red near base, and a small single black dot near base below costa; space between costal and sub-costal nervures transversely striated with alternate blackish and whitish marks as far as black spot in discoidal cell and black of apical portion and base, replaced by pale wood-brown; a broad quadrate white band (tawny on upper surface) crosses costa and discoid cell beyond black angular marks at distal end of discoid cell; other white marks corresponding with upper side. *Hind wing:* irregularly mottled with three shades of pale wood-brown and brownish white; a conspicuous large angular white spot at end of discoidal cell and three on costa; nervules white; two dark spots in discoid cell white-edged; curved row of five round unequal ocellated spots between the nervules, with one or two narrow dark outlines, within which brown with slight blue edge on basal half of three inner spots; row of lunules beyond these round spots purplish-brown, largest and darkest next angle, then a continuous whitish stripe, then a yellowish-brown one, edge with whitish lunules between brown spots on nervules. *Measurements:* Expanse of males, 1 inch 6 lines to 2 inches; of females, 1 inch 11 lines to 2 inches 2 lines. *Larva:* Blackish-brown, with a broad yellowish-white band bordered with interrupted black streaks from third to last segment over bases of legs on each side, and two less distinct darker-yellowish streaks above on each side. All the segments, except the first and second, with branched yellowish-white spines, rather less in length than half the diameter of the body; head blackish; legs ochraceous brown, greyish below. Length about 1 inch. Feeds chiefly on foreign *Compositæ*, particularly the introduced Cape Weed, *Cryptostemmon calendulacea*, for which it abandons all native plants. *Pupa:* Pale yellowish-grey dotted with brown, with a few gilt patches; three rows of brightly-gilt conical spines along back, the middle row smallest, and three rows much smaller on each side; about 8 lines long; head bifid, with two blunt conical projections.

REFERENCE.—=*Cynthia Kershawi*, McCoy, Ann. and Mag. Nat. Hist., 1868, p. 76.

Of all Butterflies there is none more famous than the *Pyrameis Cardui* (known to English-speaking collectors under the absurd popular name of "Painted-Lady Butterfly"), on account of its extraordinarily wide geographical range, having been quoted for very many years in most works on Physical Geography and the geographical distribution of animals as almost cosmopolitan; not only abundant in every country "from China to Peru" but from Britain to Australia, where it was said to be common. Of late years more accurate observations have shown that South America does not contain really the true species, and more than twenty years ago (*see* above reference) I pointed out that the Australian representative of the *P. Cardui* might be easily discriminated from the European insect, with which it had been previously confounded, by the three lower round spots on the posterior wings being bright cobalt-blue in the centre, instead of black, a character, as I stated, first mentioned to me six or seven years before by my excellent friend, William Kershaw, the senior taxidermist at the Melbourne Museum, who made our singularly fine and extensive local collection of the Insects of Victoria, and whose unequalled knowledge of the habits and distribution of our Insects, and extraordinary zeal and devotion to his duties as my assistant in this branch of the Museum, I acknowledge, with great pleasure, by dedicating the species to him. The particular character first noticed, I have, for nearly thirty years, and on the examination of literally thousands of specimens, found to have been quite invariable in all the Australian and New Zealand specimens of this our most abundant Butterfly all over the country in all kinds of habitats. It is also a distinctly smaller species than *P. Cardui*. The above measurements give the extremes I have noticed for both sexes, but in each sex the intermediate measurements are by far more common than the extremes set down, and show a very obviously smaller species. Of the male I have only seen one specimen of the smallest size set down, 1 inch 8 lines being the usual size. A few other points of constant difference will be found in the above description, with many curious coincidences, but on the whole I have no doubt of the specific distinctness of the Australian form.

The larva and pupa resemble those of *P. Cardui* very nearly, but are of smaller size. The habits are very much alike; our form, like the European one, being singularly robust and active, flying about even in windy weather, and found nearly all the year through, but most numerous in the hotter months from September to March, and more commonly than any other species, especially where the accidentally introduced Cape Weed (*Cryptostemmon calendulacea*) abounds, as for this it forsakes all other plants.* I note that that excellent observer, Mr. Trimen, does not record this amongst the plants eaten by the larvæ of the true *P. Cardui* at Cape of Good Hope.

In the latter end of September and beginning of October of last year this Butterfly appeared in extraordinary numbers for two or three weeks, accompanied by a day-flying Moth, *Agrotis spina*, almost darkening the sky with their general flight towards the south-east, covering the gear and decks of ships many miles out at sea, and filling the air on land from the northern parts of the colony down south to Melbourne. They poured into Gippsland in such quantities as to spread consternation amongst the settlers, who inundated me with letters inquiring whether their crops or orchards or vineyards would be destroyed by the larvæ expected to follow. I was glad to be able to assure them that the only likely damage would be to hated weeds. The newspapers mentioned the stoppage of trains in the tunnel on the Castlemaine Railway, from the masses of bodies of these insects crushed lubricating the wheels to such an extent that they could not bite the rails as they turned, and came to a standstill until sufficient supplies of sand could be sent.

They frequently rest on the ground or plants for a short time, with the wings expanded horizontally; when sleeping or resting for a long time the wings are brought together erect, with the reddish part of the under surface of the anterior wings concealed by the over-lapping of the hind ones; and when resting

* This curious change of habit in Victorian Insects, abandoning their native food for some introduced plant on which they thrive so much better as to become strikingly more abundant than before, has been remarked upon in our account of the *Agarista*, so destructive to the vine, *see* Decade I., Plate 8.

in this position on bare patches of ground the mottled colouring of the under sides of the hind wings serves to conceal them to a surprising degree.

EXPLANATION OF FIGURES.

PLATE 198.—Fig. 5, female, upper side, natural size. Fig. 5*a*, ditto, under side of wings in erect position of prolonged rest. Fig. 6, male, natural size. Fig. 7, larva, natural size. Fig. 7*a*, head and three following segments, magnified two diameters, to show absence of spines on head and next segment. Fig. 7*b*, three posterior segments, magnified two diameters. Fig. 8, pupa, natural size.

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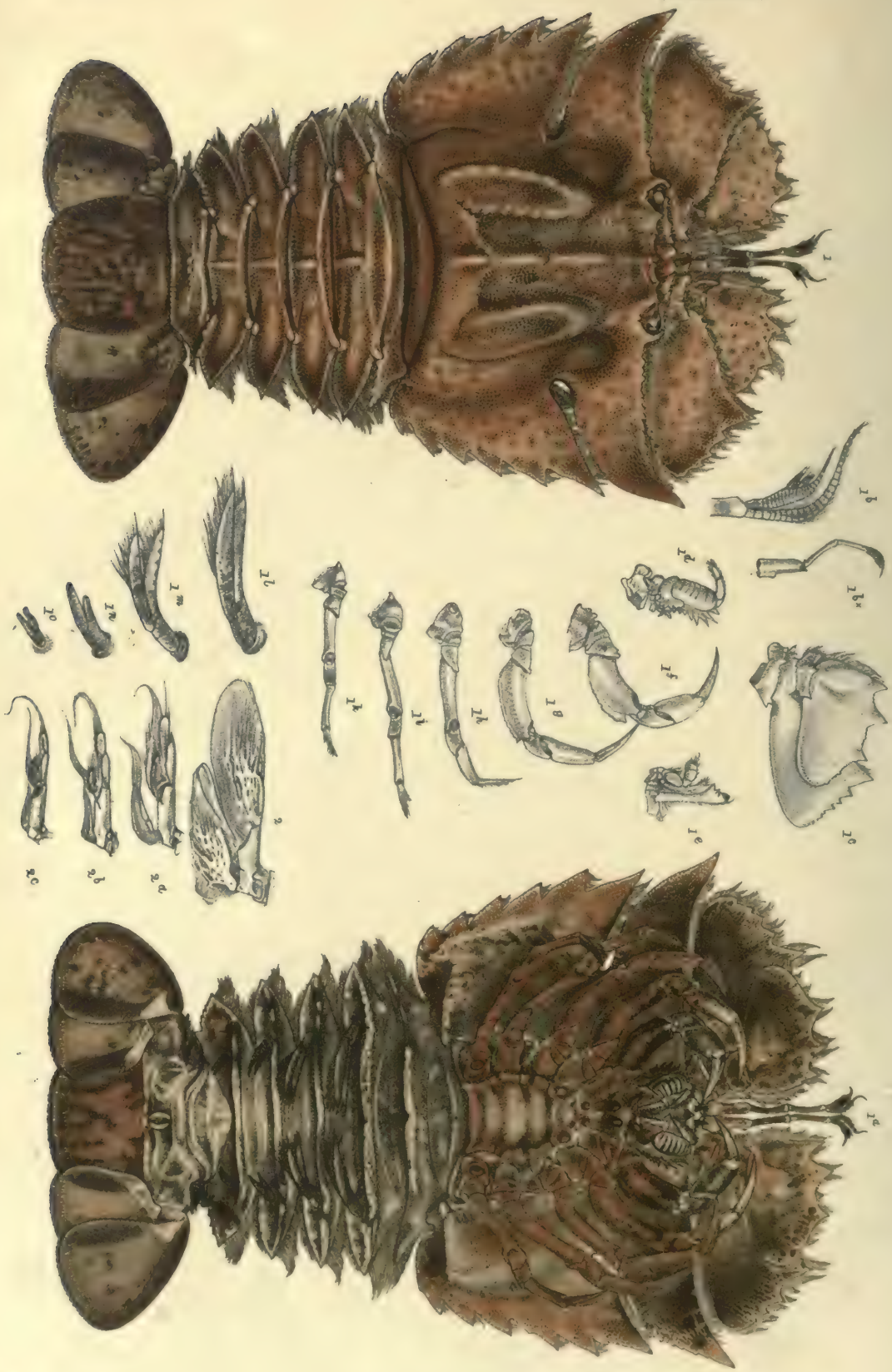
1
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PLATE 199.

IBACUS PERONII (LEACH).

PÉRON'S IBACUS CRAB.

[Genus IBACUS (LEACH). (Sub-kingdom Articulata. Class Crustacea. Order Decapoda. Section Macrura. Family Scyllaridæ.)

Gen. Char.—Carapace transverse, broader than long, depressed, with a very deep fissure on each side. Rostrum bilobate. Eyes inserted on anterior edge, far removed from the external angles; peduncle thick, recurved, acuminated towards extremity. External antennæ not far apart, squamiform, four-jointed; internal antennæ three-jointed, terminated by two many-jointed setæ. Branchiæ twenty-one. External pedipalps with two first joints externally crested, second joint with many fissures internally.]

DESCRIPTION.—Broad, ovate, male more convex in front, from greater width of second antennæ, than female; greatest width, at outer anterior angle of carapace, equal to length from inner angle of orbit to base of telson or last abdominal joint; sides tapering from anterior lateral angles of carapace to penultimate abdominal segment in nearly straight or very slightly convex lines; space between orbits one-fifth the width of anterior edge of carapace; outer angle a large flat spine curving outwards and slightly forwards from bottom of deep lateral fissure, posterior edge, and to less extent the anterior edge, more abruptly arched forwards and a little outwards; lateral fissure one-fourth the width of carapace at second lateral spine, narrow, parallel-sided, less transverse, or inclined obliquely more forward than anterior margin of carapace, both edges imperfectly crenulated with a row of minute tubercles, lower edge fringed with long hairs; six angular, gradually decreasing teeth or serratures on each side behind fissure, sometimes a smooth, most posterior, rudimentary one*; anterior edge of carapace irregularly serrated by numerous, small, unequal tubercles, arched forwards at outer angles; upper surface of carapace much flattened at the sides, thicker in the middle third, bounded by two lateral smooth keels arising in line with middle of orbits and diverging backwards, so that space between hinder ends is rather less than half the width of the carapace, while between the anterior ends it is less than one-third the width at same level; middle keel divided into four long tubercles; surface nearly smooth, finely granular at margins; granulation coarser behind posterior sulcus and within lateral keels. Outer antennæ, with first joint small, scarcely extending beyond rostrum, second joint very wide, posterior edge smooth, outer edge with five teeth, anterior largest; anterior edge irregularly serrated with small, irregularly unequal, spinose tubercles, inner ones largest; third or anterior joint with convex anterior edge with three large angular teeth; anterior edge of sinus, of carapace, and anterior outer and inner edges of outer antennæ fringed with hair. Inner antennæ with three, slender, long joints; flagella many-jointed, the outer fringed with a large tuft of hair. Four anterior abdominal segments (after the first) each with a longitudinal tubercle in middle continuing the median keel of carapace; sides serrated and fringed with hair; all granulated; fifth segment without median tubercle, but with two transverse rows of small granular spines on hind edge of terminal or coxal pieces, the outer forming an obscure point; sixth joint with granulated hind edge. Telson and lateral flaps of tail soft and

* Although Leach says five, his figure shows six, as in our specimens.

membranous, crustaceous at base. Hind leg of male simple, of female feebly didactyle. Outer maxillipede with a row of spines on outer edge of fourth joint, which is transversely ridged on convex lower surface; thighs of two anterior pairs of legs abruptly thicker than the others. Sternum semi-oval, with a short spine at hind outer angle of last joint and more near middle of outer ends of other joints. Order of length of thighs, two, three, four, one, and five. *Colour:* Reddish, dull cinnamon-brown on upper surface, sides of carapace and outer antennæ spotted with round, darker, unequal clouds of same colour, and a few irregular marks of dark Vandyke brown on telson and lateral tail flaps; underside of abdomen pale yellowish; underside of carapace cinnamon-brown, with blackish-brown on basal portions of outer antennæ and anterior spine of carapace, behind bases of legs and on swimmerets. *Measurements:* Length of average specimen from anterior edge of outer antennæ to end of telson, 4 in. 7 lines. Proportional measurements to that length, as 100: greatest width in front of carapace, $\frac{77}{100}$; depth of lateral sinus, $\frac{18}{100}$; width of ditto, $\frac{2}{100}$; space between inner angles of orbit, $\frac{12}{100}$; length of carapace, $\frac{35}{100}$; width of second abdominal segment, $\frac{43}{100}$; length of telson, or last abdominal segment, $\frac{19}{100}$; length of first joint of outer antennæ, $\frac{4}{100}$; width of ditto, $\frac{8}{100}$; length of second joint, $\frac{2\frac{1}{2}}{100}$; width of ditto, $\frac{25}{100}$; length of third joint, $\frac{2}{100}$; length of lamina, $\frac{13}{100}$; width of ditto, $\frac{17}{100}$; length of first joint of inner antennæ, $\frac{7}{100}$; width, $\frac{2}{100}$; length of second joint, $\frac{6}{100}$; width, $\frac{1}{100}$; third joint, $\frac{5}{100}$.

REFERENCE.—Zool. Misc., v. 2; t. 119.

I retain Leach's name for this species, as the first published, and think it undesirable to use for it, as Mr. Spence Bate has done, Péron's manuscript name *I. incisus* in the Paris Museum, referred to but not used by Leach in his original description.

One enormous specimen, 9 inches long and 5 in. 3 lines wide at front of carapace, presented by D. Best, Esq., from Phillip Island, is more roughly granular than usual and has seven distinct, large, angular teeth behind sinus. Not very uncommon in Hobson's Bay and on the shores outside Port Phillip.

EXPLANATION OF FIGURES.

PLATE 199.—Fig. 1, dorsal view of average specimen, natural size, male. Fig. 1*a*, under view of the same. Fig. 1*b*, flagella of inner antennæ, magnified to show tufts of hairs on outer branch. Fig. 1*b*†, inner antennæ, natural size. Fig. 1*c*, one of the outer antennæ, viewed from below, natural size. Fig. 1*d*, outer maxillipede, natural size, showing spinous crest on outer edge of fourth joint, and transverse sulcation of its lower surface. Fig. 1*e*, jaws, natural size. Figs. 1*f*, 1*g*, 1*h*, 1*i*, 1*k*, five thoracic legs, natural size. Figs. 1*l*, 1*m*, 1*n*, 1*o*, four swimmerets of abdominal segments, twice the natural size. Figs. 2, 2*a*, 2*b*, 2*c*, swimmerets of female, twice the natural size.

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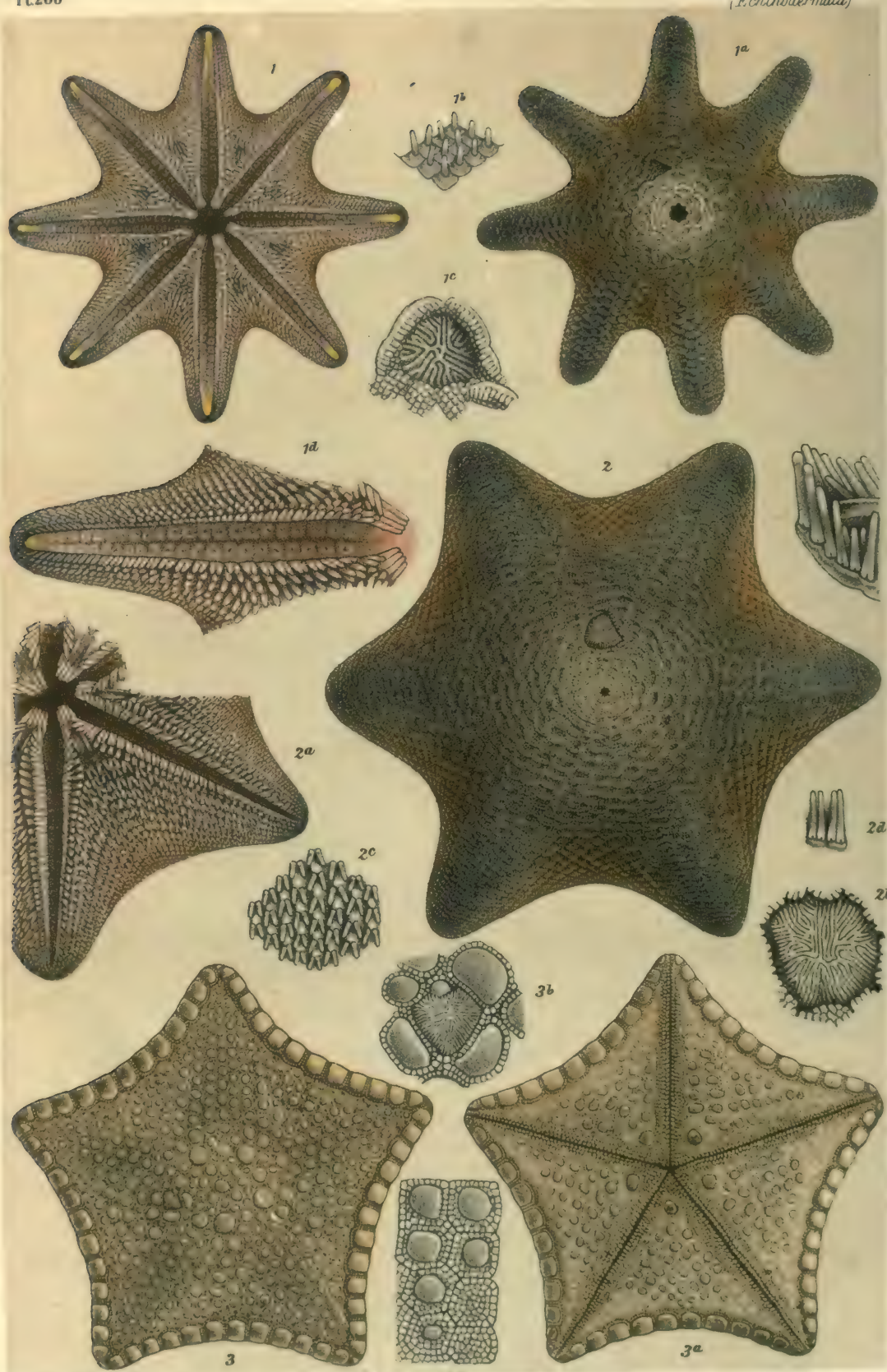

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PLATE 200, FIG. 1.

ASTERINA CALCAR (LAM. RESTRICTED BY GRAY).

THE EIGHT-RAYED CUSHION STARFISH.

[Genus ASTERINA (NARDO). (Sub-kingdom Radiata. Class Echinodermata. Order Asteroidea. Family Asterinidæ. Sub-family Asterininæ.)

Gen. Char.—Body tumid, with five to eight short blunt rays, back convex; oral surface flat or concave. Ossicula of each surface with one or more mobile tapering spines; edge sharp, with very minute marginal plates. Each of the ossicula of upper surface cresent-shaped, with a marginal series of very short spines; ambulacral spines in groups of two or five.]

DESCRIPTION.—Very gibbous, with eight short, nearly parallel-sided rays abruptly bluntly rounded at the tip; taking centre of mouth to tip of rays as 100, to middle of intervening margin, $\frac{60}{100}$. Adambulacral plates bordering ambulacral, each with two spines. Interambulacral plates between ambulacra on lower or oral side, each forming a broad slightly radiated base to a large, tapering, single spine. Plates of upper or dorsal surface thick, crescent-shaped, with from six to twenty minute spines fringing the convex edge of each in one or more rows. There are six long, slender, tapering spines to each of the large, interambulacral, trigonal oral plates, forming groups round the mouth; the middle pair longest, the others gradually diminishing to outer ones. Madreporiform tubercle subtrigonal. *Colour:* Very irregularly varied in different individuals, with usually the rays dull purple, mottled with darker, and more or less of dull red towards margin between the rays; others have these positions of the red and purple reversed; others are uniform rich purple above. Underside pale flesh-colour, with occasional pale purplish portions. *Measurements:* Diameter of ordinary specimen from tip to tip of rays, 2 in. 6 lines; from edge to opposite edge between rays, 1 in. 6 lines; depth, 6 lines.

REFERENCE.— = *Asterias calcar*, var. *C. octogona*, Lam. Anim. sans vert., v. 2, p. 557.

This is the commonest of all the Starfishes on the coast; adhering to stones below low-water mark. It is extremely variable in the extent and intensity of the purple on upper surface. The whitish central patch in the specimen figured is very unusual. It is easily distinguished from the almost equally common *A. Gunni*, by having eight longer and more parallel-sided rays, and by having a single spine on each of the inter-ambulacral plates between the ambulacra below.

Some specimens are of the rare diameter from tip to tip, of three and a half inches; and one specimen has only seven rays. On some specimens some of the plates of the row of adambulacral plates bordering the ambulacra seem to have only one spine, instead of the usual two; this is however abnormal, and two spines to each base is nearly constant.

The specimen figured is from Brighton Beach.

EXPLANATION OF FIGURES.

PLATE 200.—Fig. 1, average specimen, natural size, viewed from below, showing long-spined, interambulacral mouth plates and single-spined interambulacral plates. Fig. 1*a*, same, viewed from above, showing madreporiform tubercle and crescentic spinulose plates. Fig. 1*b*, single-spined, large-based interambulacral plates of lower or oral side, magnified three diameters. Fig. 1*c*, madreporiform tubercle, magnified four diameters. Fig. 1*d*, portion of underside, magnified two diameters, showing two spines to each ambulacral plate, and the single spine of each interambulacral plate.

PLATE 200, FIG. 2.

ASTERINA GUNNI (GRAY).

GUNN'S CUSHION STARFISH.

DESCRIPTION.—Moderately tumid, depressed, with six very slightly projecting blunt rays and six slightly concave intervening sides; taking from centre of mouth to tip of ray as 100, from same point to middle of intervening margin, $\frac{75}{100}$. Interambulacral plates on greater part of lower or oral side each with two divaricating, short spines; one or two rows of plates next the ambulacra, each with one single, larger spine; adambulacral plates in some individuals with two, in others with three spines each. Thick crescentiform plates of upper surface each with very numerous, small spinules. Madreporiform tubercle large, subtrigonal. Ten or twelve slender spines on each of the trigonal interambulacral oral plates. *Colour:* Generally purple above, sometimes with reddish between the rays; flesh colour below, with purplish along sides of ambulacra and round mouth. *Measurements:* Diameter of ordinary specimen, from tip to tip of rays, 3 in. 6 lines; to opposite edges of intervening margin, 2 in. 6 lines.

REFERENCES.—*Asterias calcar*, var. *b*, Lamarck, Hist. Nat. A.S.V., vol. 2, p. 557; = *Asterina Gunni*, Gray, Ann. and Mag. Nat. Hist., 1840, vol. 6, p. 289.

This species is rather larger, broader, and flatter than *A. calcar*, with only six, less defined rays, scarcely projecting beyond the only slightly indented or moderately concave intervening sides, and is further easily distinguished by the two spines, instead of one, on all the middle interambulacral ossicles below. It inhabits the same parts of the shore as *A. calcar*, but is not quite so common.

EXPLANATION OF FIGURES.

PLATE 200.—Fig. 2, ordinary specimen, viewed from above, natural size, showing spinulose crescentiform plates. Fig. 2*a*, portion of underside, natural size, showing the pair of diverging spines on all the middle interambulacral plates, and the marginal row next the adambulacral plates with single larger spine, and pairs of more slender adambulacral spines, and the groups of longer spines on the oral plates. Fig. 2*b*, madreporiform tubercle, magnified three diameters. Fig. 2*c*, median interambulacral plates, each with its pair of diverging spines, magnified three diameters. Fig. 2*d*, pairs of spines on adambulacral plates, magnified three diameters. Fig. 2*e*, group of ten spines on edge of one of the six interambulacral oral plates.

PLATE 200, FIG. 3.

PENTAGONASTER (TOSIA) AURATA (GRAY).

THE TWELVE-PLATED SHIELD-STAR.

[Genus TOSIA (GRAY). (Sub-kingdom Radiata. Class Echinodermata. Order Asteroidea Family Pentagonasteridæ. Sub-family Pentagonasterinæ.)

Gen. Char.—Body flat, pentagonal, sides approximately rectilinear, slightly concave between the blunt tips of the rays. Two rows of marginal plates, few, smooth, with one row of granules on edge; abactinal or dorsal area and interambulacral plates below covered with rounded or polygonal smooth or granulated plates. Ambulacra margined by three or four rows of short spinules. Anal aperture very minute on right posterior edge of dorsocentral plate when madreporite is placed in upper right-hand interradium.]

DESCRIPTION.—Sides gently concave. Dorsal plates flat, irregularly polygonal, rounded, close, each with one row of blunt granules round the edge; three or five rows running to the angles slightly larger and more regularly hexagonal than the intervening ones; all diminishing towards the margins; closely touching, especially below; four basilar ones near the middle larger than the rest, one opposite the middle of each side, but the fifth, near the madreporite, not conspicuous. Madreporiform tubercle subtrigonal, the angles truncated, entirely covered with minute

vermicular and branched ridges, situated at about one third the distance from the centre to the margin. Marginal plates flattened, only slightly convex, with one row of granules round each; plates rather larger at middle of sides than at salient angles or tip of rays, twelve to fourteen above, and twelve to sixteen below from tip to tip of rays; one small odd plate in middle above. Oral actinal or under-plates closely touching, generally covered completely with granules, but some few with smooth central portion, with one, two, or three rows of granules on margin; two rows of blunt spines and two rows of granules larger than the rest bordering the ambulacra on each side (two compressed blunt spines on inner face of each adambulacral plate, and two shorter behind them). The five triangular mouth plates are bordered with spines like those of the adambulacral plates, within which are thick prismatic granules. From mouth to tip of ray (R), taken as 100, from same point to middle of side (r), $\frac{65}{100}$ to $\frac{70}{100}$; average diameter, 2 in. 6 lines. *Colour:* Often rich yellowish orange ("old gold"), more commonly clouded more or less with dull purple.

REFERENCE.—P.Z.S., 1847, p. 80; Gray, Synop. sp. St., t. 16, f. 2.

The genus *Tosia* of Gray, taken as a sub-genus of *Pentagonaster* by Perrier, and merged into that genus by Sladen, is a convenient group or subdivision of the larger genus, which I think may advantageously be continued.

The Shield-Stars, as the flattened pentagonal Starfishes with large marginal plates and no projecting rays are called, are common on our shores, two species of the present genus being abundant under stones a little below low-water mark in Hobson's Bay, and along the rocky outer shores, the present species being distinguished from *T. Australis*, by its more numerous and flatter marginal plates (only six in *T. Australis*) and the greater number of plates below being covered with granules; some specimens having all on the actinal side granulate, and others having few or many smooth in the middle, with one, two, or three rows of granules round the margin. There are usually twelve marginal plates above and below on each side between the points of the ambulacra, and where they are more numerous the additional plates near the apices, are much smaller than the others; the plates towards the middle of the sides are always perceptibly larger than those near the angles.

I note that M. Perrier in the "Annales des Sciences Naturelles" for 1885, finds the marginal plates varying from eight to fourteen in his *Pentagonaster Gosselini* and this agrees with my experience of this present species, showing that the character varies more

than has usually been allowed for. In that species, Perrier counts usually ten. The usual number is of course a valuable character when combined with some other peculiarity.

I have not observed any pedicellariæ in this species.

Explanation of Figures.

Plate 200.—Fig. 3, average specimen, dorsal or abactinal view, natural size. Fig. 3*a*, same, oral or actinal side. Fig. 3*b*, madreporiform tubercle, magnified three diameters. Fig 3*c*, some plates from lower or oral side, showing at lower right-hand corner typical character of plates entirely covered with granules; at upper left-hand corner smooth plate with one row of granules, and the others showing two or three rows, magnified three diameters.

Frederick McCoy.

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